

A Winter Forest Scene.

Courtesy of L. D. Bonebrake, State Superintendent of Public Instruction, Ohio.

INDIANA

ARBOR AND BIRD DAY ANNUAL

FOR THE

SCHOOLS OF INDIANA

ISSUED BY
FASSETT A. COTTON
State Superintendent of Public Instruction
and
WILLIAM H. FREEMAN
Secretary State Board of Forestry



INDIANAPOLIS:
WM. B. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING.
1904.



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TO TEACHERS AND PUPILS OF PUBLIC SCHOOLS OF INDIANA.

One of the highest duties of the school is to stimulate in the minds of the children a sincere love for nature and a desire to cultivate and protect useful and beautiful trees and birds. To this end, certain days of the school year have been set apart for a number of years in order that the teachers and pupils may have an opportunity to give a distinct recognition to the value of the plants and animals in general, and more particularly to the usefulness and beauty of the birds and trees. It is hoped that Arbor and Bird Days may be observed in every school-room in the State, and that as a result, the future homes, school-lawns, roadsides, parks and woods will be more carefully protected and nurtured in regard to bird and tree life. Nothing speaks more for the culture of a home or a school than well-kept lawns with beautiful plants, trees and vines which present inviting places for the native birds.

This program has been made with great care and it is believed that it will be beneficial to the teacher in directing this important work. The teacher should read carefully all that is herein given in order that he may be prepared to direct the children intelligently in executing the program. If the teacher will study the record of the waste of the forests of Indiana and of the ruthless destruction of the birds he will soon become enthusiastic in favor of rendering all possible protection to them.

Mr. W. H. Freeman, Secretary of the State Board of Forestry, has cheerfully rendered valuable assistance in this work. Members of the Audubon Society have furnished much helpful material.

Trusting that the children and patrons of the schools of Indiana may be inspired with a deeper love for the trees and birds than ever before, I am,

Sincerely,

FASSETT A. COTTON.

PROCLAMATION BY THE GOVERNOR.

There has been within recent years a widespread awakening of interest in reforestation, especially in Indiana, a State favored lavishly by nature with timber resources that to the pioneer seemed limitless and inexhaustible. The rapid development of the agricultural and industrial interests of the State has been accompanied by a sacrifice of our forests, until the people of Indiana have been brought to a realization of the importance of systematic effort with a view to preventing further devastation. There has arisen a patriotic interest in the planting and preservation of trees, which will not only furnish the raw material necessary to the maintenance of many of Indiana's most important domestic industries, but perform an invaluable aesthetic function in adding variety and charm to the landscape.

Appropriately, therefore, the State has taken cognizance of the economic necessity of forest restoration and preservation. Forestry laws adapted to the peculiar conditions existing in this State have been enacted. Apparent progress has been made in arousing the people of Indiana to the vast importance, especially to future generations, of that systematic and persistent effort necessary to the ample realization of the possibilities of the soil and climate of our State in the development of timber resources.

In further recognition of the State's interest in this important movement, I, Winfield T. Durbin, Governor of the State of Indiana, do hereby designate and proclaim Friday, April 22, and Friday, October 21, 1904, to be observed as Arbor Days throughout the State, by the planting of trees for the beautification of public and private grounds and highways. And it is hereby recommended that those having charge of public and private schools shall provide for the further celebration of the second date hereby set apart by exercises appropriate thereto.

Done at the Capitol of Indiana, in the City of Indianapolis,
this twenty-eighth day of March, in the year of our Lord, nineteen
hundred and four.

WINFIELD T. DURBIN,

Governor of Indiana.

By the Governor:

DANIEL E. STORMS,

(Seal) Secretary of State.

TO TEACHERS, OFFICERS, PATRONS AND PUPILS OF THE PUBLIC SCHOOLS OF INDIANA.

Greeting: It affords me pleasure to again prepare for your consideration and help suggestions and information concerning tree planting and forest culture that the observance of Arbor Day may be of more value and interest to you each and all, and thereby result in a more universal participation.

The institutions of tree planting for ornament and practical forestry for the advancement of the resources of the country are matters which are no longer viewed with scorn and hesitation by intelligent observers, but on the contrary are regarded as necessary establishments and deserving of sincere attention.

In addition to the material value of Arbor Day observance there is a spiritual elevation to the participant. Among the good results of the rightful observance of this custom are the stimulation of the princely virtues; patriotism, self-sacrifice, charitableness, truthfulness and kindliness. The devoted observance of these institutions not only on the particular day but throughout the year, will go far toward forming the right destiny of the nation both physically and morally by the character effects.

The following extract from a speech of Hon. J. Sterling Morton shows the spirit of conscientious treeplanting:

"It seems to me that a tree and a truth are the two longest lived things of which mankind has any knowledge. Therefore, it behooves all men in rural life, besides planting truths, to plant trees; it behooves all men in public life to plant economic and political truths, and, as the tree grows from a small twig to a grand spreading oak, so the smallest economic truth, as we have seen in the United States, even in the last year, can grow so as to revolutionize the government of the great Republic. I say, then, that we should plant trees and plant truths, and let every man struggle, so that when we shall all have passed away we shall have earned a great epitaph, which we find in St. Paul's Cathedral in London. You remember Sir Christopher Wren was the architect of that

wondrous consummation of beauty in building, and there, among the heroic dead of England's greatest heroes upon land and sea, repose his remains. On other tombs are marked words of eulogy, fulsome sometimes, always intense, but upon the sarcophagus where Sir Christopher Wren's remains repose is inscribed only these simple words: '*Si quaeris monumentum circumspic*'—If you seek my monument look around you. So every man, woman and child who plants trees shall be able to say, on coming, as I have come, toward the evening of life, in all sincerity and truth: 'If you seek my monument, look around you.' "

With the inspiring lessons extending through the year every individual will respond to this noble work of benefiting the State, himself and future generations. May each and every one faithfully do his part and let this Arbor Day celebration be the height of such a sincere resolve.

Very truly yours,

W. H. FREEMAN,

Secretary State Board of Forestry.

ARBOR DAY TREE PLANTING.

Tree planting on Arbor Day by the schools is, usually, accompanied by literary exercises consisting of essays, songs, recitations and addresses. In most cases the literary program forms the absorbing feature of a day intended for another purpose. I am not attempting to discourage the literary exercises in connection with the tree planting program, as it is a means of stimulating interest and bringing together the community and causing a revival of interest in both school and trees, but I suggest that much more attention be given to the matter of the arboriculture feature. The selection, the method of planting, the time when to do it and the care devoted to the trees after the Arbor Day program has been rendered are the vital elements which bring results from the exercises, and if these matters are not given emphasis the day's program falls far short of the purpose.

The selection of the trees for Arbor Day planting should be attended to with care, and only such ones chosen and planted as are hardy to the conditions at hand. The school ground should not be made a place of experiment, and, naturally, trees on public grounds are exposed to injury more than on private grounds. Any trees which can not endure moderate abuse should not be chosen, as under the best of restrictions the soil will be trampled, twigs broken and other numerous common injuries imposed. The soil of the school or other grounds intended for planting should be studied, because differences in soil make necessary differences of tree selection and all the attendant features of propagation. Because a tree is known to grow in the locality does not imply that it will grow on any spot in the community. Sandy soils and clay soils are found in alternate relation in almost any part of the State, in both strata and territorial connections, and a tree which thrives in one soil may have a struggle to exist in the other. When a study of the soils has been made to determine the differences in kind and porousness and then adaptable trees selected, rightly planted and properly cared for, after success is almost assured.



A view showing the proper root system and top pruning for a Sugar Maple dug from the forest for Arbor Day tree planting. A large amount of the roots are carefully saved and the top is trimmed back about one-half to correspond with the same.

There are also other questions which should be considered before the selection of trees is made, and they are the permanent devotion of the ground to the purpose for which tree planting is done, the immediate needs and the space allotted to a tree. If the grounds under consideration are to be devoted permanently, so far as can be foretold, to the use for which it is set apart and the present needs of tree decoration are not urgent, then the long-lived trees should be chosen and such as will correspond with the other conditions of soil and moisture. If the area is not likely to be permanently devoted to the present uses and the decoration is to fill a limited time and necessary want, then the short-lived, fast growing trees should be selected. In cases where the conditions are permanent and the needs immediate a compromise can be made by planting the different lived trees in alternate harmony. They may be planted closely and at a proper development in growth the short-lived trees can be cut out and the permanent trees left at proper distances.

In places where the space will not permit large spreading topped trees the selection should be of trees the tops of which are more dense and compact. The following lists will give information concerning selections. The long-lived trees best suited for decorative plantings on permanent open grounds are the American elm, American ash, sugar maple, Norway maple, tulip poplar, linden or basswood, American chestnut, sweet gum, sycamore, scarlet oak, red oak, white oak, yellow locust and some of the evergreens. Those best suited for limited time are red maple, ginkgo, pin oak, horse chestnut, hackberry, catalpa, Lombardy poplar, some of the evergreens and a few foreign varieties. Where the space is limited but permanent the trees best suited and which adapt themselves to the conditions are the sugar maple, Norway maple, linden, chestnut, sweet gum, American ash, scarlet and red oak and tulip poplar. The trees which should not be planted any place for decoration are the Carolina poplar, silver maple and other similar kinds.

The time and method of planting should be given the closest attention. The time is subject to difference of opinion, but such is mostly due to the object in mind. If an agent or individual cares only to dispose of his trees he may argue that any time is good for planting, but a scrupulously honest individual will not disregard

the proper time to plant. In Indiana fall planting may sometimes be done to advantage, but it can not be held as a rule to practice. In all ordinary conditions early spring planting is more successful, especially for deciduous trees. The best time is immediately after the freezing is over and the soil is dry enough. The reasons given against fall planting are that the trees do not get a sufficiently established root system to sustain them against the hard freezings and thawings of the winter. If it is possible the planting should be done on a cloudy, cool day, and unless the atmosphere is very moist the trees should be kept moist by having their roots submerged in water or a thin mixture of earth and water and only removed as they are planted. A very few minutes' exposure to the air will injure the small fibrous roots which are the feeders of the tree.

The holes for the tree should be dug a few days before the time of planting. They must be large enough so that the roots can be placed in their natural positions without the least cramping. It is well to have a foot or more additional space on all sides of such ample depth that plenty of loose soil can be placed under the roots. In digging the holes place the top soil by itself and if the lower soil is poor and lumpy, it should be substituted by richer finely pulverized earth for the planting. Use no manure unless it is thoroughly mixed with earth, and such should not be placed around the roots, as manure will burn and rot them. Good, clear, rich, heavy, finely pulverized soil is at all times better for tree planting. By digging the holes a few days beforehand the soil requisites can be arranged and the proper moisture conditions secured. If the earth is too wet it will afford time for proper drying out, and if too dry it will afford time to fill the holes with water and saturate till the result is satisfactory for good planting. A good drainage is essential, as but few trees will live in a place where water settles around the roots and is retained by a heavy clay.

The tree should be set at a depth of an inch deeper than it originally grew, and should be set firmly and fastened by strings tied to stakes to prevent the winds from swaying and loosening it in the ground. Be careful in doing this not to injure the bark. After planting, the ground should be mulched around with rotten substance either of straw, tanbark or sawdust. This device will



A second view of the same Sugar Maple showing the improper method of pruning the roots and top so generally practiced in planting trees dug from the forest for Arbor Day observance.

not only retain the moisture but will keep down the weeds and fertilize the soil. With this treatment watering will not be necessary except in excessive drought, in which case several gallons of water should be poured around the roots of the tree every few days until the danger is passed.

Many of the reasons for the failure of the tree to live and grow after it has been planted can be ascribed to the injuries sustained in digging it up. The roots are torn, strained and mutilated or such scanty root system is taken up that the tree has no means of keeping up life. In digging up the tree the roots should be preserved as entire as possible and entirely practical. If the tree is of a dimension of an inch or two in diameter and of four or five years' growth, the root system should be preserved for at least three feet around the stem. Extreme caution should be exercised in retaining the small feeders. If a larger tree is taken up a ball of earth of the dimensions above should be kept compactly intact with it and planted. Having carefully dug the trees, the roots should be examined and cut away smoothly and completely all bruised and broken roots. By so doing decay will not occur and fibrous roots will form quickly around all such places. Top roots may be cut down to easy requirements for planting in the cavities. The tops of the trees should always be pruned back to harmonize with the diminished root system caused by digging. A good suggestion is the cutting of the branches back from one-third to one-half, but at no instance should they be cut to bare poles. In cutting the top back the branches should always be cut near a bud as the pruned member will always die back to the nearest bud. This will avoid the dead stubs so frequently seen on pruned trees a year or so after.

When trees are selected from the forest, they should be secured from regions open to the sun rather than from a densely shaded area, as trees from the latter places are tender and weak and will not survive the sun and open exposure. All newly planted trees should be protected on the extreme side to the sun exposure by boards or tree boxes. They should also be protected from stock and other dangers by tree boxes. Figs. 1 and 2 on following page give good forms of protection and are very simple in construction.

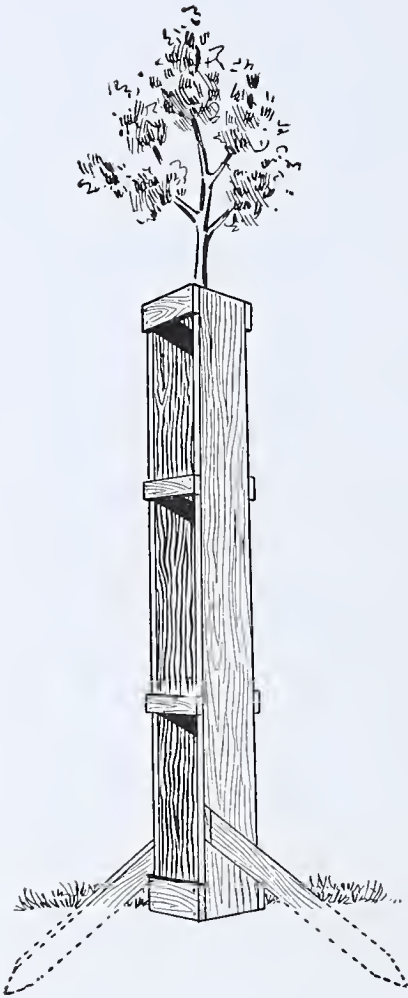


Fig. 1.

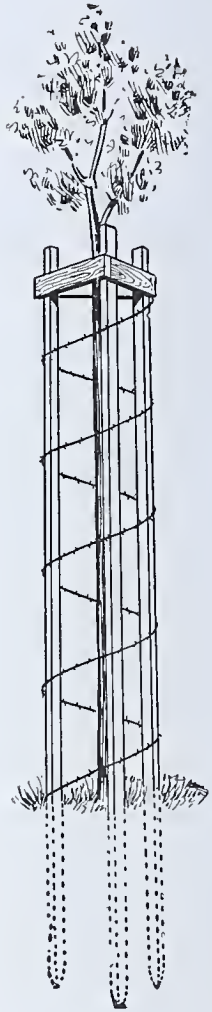


Fig. 2.

TREE PLANTING ON RURAL SCHOOL-GROUNDS.

W. L. HALL, ASSISTANT SUPERINTENDENT TREE PLANTING, BUREAU
OF FORESTRY.

KIND OF TREES TO PLANT.

The first rule to lay down is to plant only the kinds that are known to be hardy. A school-ground plantation is no place for experiment. Naturally the trees will have to endure greater hardships than those of a private plantation; they will be likely to have less cultivation and be subject to more abuse. No matter how strict the rules, the soil about them will be more or less trampled, and twigs will sometimes be broken from their tops. Any tree that cannot endure moderate abuse of this kind should not be given a place on the school-ground.

On account of difference in the soil, a tree that thrives in one place in a locality may not thrive in another place. Sandy soils and clay soils are often found near together, and trees that grow thriftily in sandy soil may have a hard struggle to exist when planted in clay. For this reason both the soil and subsoil of the school-ground should be carefully examined, and a list should be made of trees in the neighborhood that are thriving on soils of the same character, and no other species should be used. Much better success may be expected with a soil and subsoil of a porous character than with one that is tenacious and impenetrable. Yet a careful study will show numerous species adapted to each kind of soil.

Elms, oaks and maples are to be had almost anywhere, and are easily transplanted. They are as beautiful as any trees to be found, and are in every way well adapted for the school-ground. They grow on a great variety of soils, and can be easily raised from seed if young trees are not available. Every region will afford other valuable sorts, such as beeches, chestnuts, walnuts, ashes, pines, or spruces. From these and such other desirable kinds as the locality affords the selection should be made.

The school-ground being permanent and need of trees continuous, for the most part long-lived trees should be used. But where the present need of trees is great, there is another side to the question. A short-lived tree grows quickly, coming into early usefulness, and serves its purpose from twenty-five to fifty years. A long-lived tree usually grows more slowly, but serves its purpose for a century or more. In many cases it is advisable to use the two kinds in such a way that the long-lived trees will become useful about the time the short-lived trees reach maturity. The latter can then be removed, leaving the ground to the long-lived trees. In all cases an ultimate stand of such trees as elms, oaks, walnuts or chestnuts should be the aim.

It may seem that the number of kinds which can be used for school-ground planting is small, but this is not the case. In almost all sections of the country a long list of species fully adapted to the purpose can be made out. In selecting among these the aim should be to give the plantation as much variety as possible, since among other purposes it is to serve that of instruction.

OBTAINING THE TREES.

In many places trees can be obtained from the neighboring forests, from the banks of streams, from plantations, or even from open fields. If they have had normal conditions of growth and are taken at the right time, they are almost as valuable for planting as nursery-grown seedlings. Pine, spruce, and cedar are to be collected in unlimited numbers in many forests, and frequently ash, maple, and elm are almost as abundant. They may be gathered either in the fall or spring, but unless they are very carefully heeled in and protected over winter the better time is early spring. In collecting forest seedlings only the small trees that have grown in the light should be taken, as these are more likely to be young and vigorous than those grown in the shade. The collector should never pull the trees from the ground, but should dig them carefully with a spade, preserving as much of the root as possible.

TIME AND MANNER OF PLANTING.

South of the thirty-seventh parallel, fall planting is safe and often advantageous. North of this, spring planting should be the rule, as fall-planted trees can scarcely develop sufficient roots to

sustain themselves during the winter. The most successful nurserymen practice early planting for deciduous trees, beginning operations as soon as the ground ceases freezing. Evergreens are not planted until later; some even wait until the young growth is starting. If possible, planting should be done on a cool, cloudy day. Unless the day is very moist, the trees should be carried to the planting site in a barrel half filled with water, or a thin mixture of earth and water, and lifted out only as they are wanted. Even a minute's exposure to dry air will injure the delicate roots—the feeders of the tree.

The roots should be extended in their natural positions and carefully packed in fine loam soil. It is a good practice to work the soil about each root separately and pack it solid with the foot. As the hole is filled, the earth should be compacted above the roots and around the stem, in order to hold the tree firmly in place. The last two inches of soil should be very fine, and should lie perfectly loose. It will serve as a mulch to retain the moisture.

Trees should be planted neither in very wet nor in very dry soil. If the soil is wet, it is better to wait until it is drier. On the other hand, if good cultivation has been maintained the year previous to planting the soil is not likely to be so dry that trees will not start. Besides insuring a supply of moisture, such cultivation puts the ground in good physical condition for planting.

With this treatment watering will scarcely ever be necessary. If it is, the holes may be dug a few days beforehand and filled with water. They should be refilled as the water soaks away until the soil is fully moistened. A thorough irrigation, when that is possible, is still better. As soon as the soil becomes somewhat dry the trees should be planted. While it is a common custom to water at the time of planting, those who do no watering are usually the most successful. Even in the semi-arid regions some successful growers apply no water, but keep up an excellent system of cultivation, thereby retaining the soil moisture.

The spacing of the tree is not so important in school-ground planting as in forest plantations, yet it is worth consideration. The trees should not stand so near together as to produce long, slender poles; on the contrary, short, thick trunks are desirable, to support large tops and withstand heavy winds. From eight to twelve feet apart will be suitable spacing distance. Where large

blocks are to be planted the trees may be closer, but it is scarcely ever desirable to plant them closer than six by six feet.

WHY TREES DIE IN TRANSPLANTING.

To many persons it is a mystery why trees die after being transplanted. They do not die without cause, however, and when one begins to wither something is wrong. Oftentimes the result is not to be noticed until weeks after the injury; in other cases it is apparent in a few days. After the injury has been done it can be overcome only by the subsequent growth of the tree. All the assistance that can be given is to make the surroundings of the tree favorable for growth. The following are some of the causes of death among transplanted trees:

The loss of the principal part of its root system when the tree is being taken up is a great shock to its vitality, and frequently causes its death. A very large part of the root must be cut off, for usually the space surrounding the tree is filled with fibrous rootlets, myriads of which can scarcely be detected with the naked eye. Almost all of these are lost, as well as many of the larger roots. Mr. D. C. Burson, of Topeka, Kansas, last year dug up and measured as much as he could of the root system of a vigorous hardy catalpa seedling that had grown from May till November. This six-months-old seedling showed over 250 feet of root growth. By the methods in common use only a fifth, or perhaps as little as a tenth, of the root is taken up with the tree in transplanting. Such loss throws the root out of balance with the top. If the top is not shortened, or in some way protected, the leaves may evaporate more moisture than the roots can provide, resulting in the death of the tree.

With proper subsequent treatment a tree can endure the loss of many roots, but instead of the needed protection it often gets much unnecessary exposure to sun and dry air. This may be in digging, packing, shipping, unpacking, or any other of the various handlings which it undergoes. Exposure causes the death of more trees in transplanting than any other single cause. This can usually be prevented.

The failure to pack the soil tightly about the roots is a common error in planting. It causes injury in two ways: it leaves the tree unstable, to be rocked to and fro or even blown down by

the wind; it also prevents the first growth of rootlets from absorbing foods. They can not absorb unless good, fine soil is firmly packed around them. Clods will not pack snugly. Likewise manure or litter of any kind mixed with the soil may prevent firm packing. Anything that prevents the soil particles from coming into close contact with the roots is sure to be injurious. Another error is in shallow planting. This allows wind and water to lay bare the roots, and in a short time the tree dies. Crowding the roots into too small a hole is a similar difficulty. Such errors are more often due to lack of experience and skill than to haste. The unskillful planter will hardly plant well, however slowly he may go.

Trees are often injured by being planted in wet soil. Whether the excessive moisture is a permanent or a temporary condition is likely to make little difference in the results. If it is permanent the water prevents the air from reaching the roots, while if it is only temporary the trampling of the soil over them causes it to stick together so that on drying it becomes baked, leaving them impacted in a hard lump of earth which excludes the air. Excessive air currents in the soil are injurious by drying the roots, but a constant permeation of the soil by the air is necessary to supply oxygen. This process is precluded by either the saturation or the baking of the soil. Undrained pockets occur here and there even in well-drained fields, and are always difficult to deal with in tree-growing.

Another cause of death is the drying out of the soil. Summer droughts are not unknown in any part of the country, and are very frequent in parts of the Mississippi valley and on the plains. Occasionally they are so intense and long continued that it is difficult to make recently transplanted trees survive, even when carefully planted and cultivated. In such a time, those which are poorly planted and cultivated are almost sure to die. Frequently, too, weeds and grass grow up in the plantation and draw off the moisture, thereby greatly diminishing the supply for the young trees.

On a school-ground there is a likelihood of the trees being injured by the trampling of the soil. The pupils will naturally wish to play around them, and unless they are restrained the soil will

soon become compacted. It then dries out very quickly, and in time of drought the trees are sure to suffer.

CARE OF TREES AFTER PLANTING.

Important as the process of planting is, one can never be certain that a tree planted with the greatest care will live and reach maturity. Much depends upon the after-treatment. In many parts of the country cultivation is absolutely essential, and nearly everywhere a tree will thrive better and grow faster during its early years with cultivation than without it. The purposes of cultivation are mainly to protect young trees from the encroachment of weeds and grass, to keep the soil in good physical condition, and to retain the moisture. Good cultivation is that which serves these purposes without injuring the trees. It does not necessarily include deep tillage. In fact, deep tillage may be positively injurious by breaking off the feeding roots, and is usually not necessary to loosen the soil. Very few soils are too hard for tree roots to penetrate if moisture is plentiful. The best way to retain moisture is by frequently stirring the soil to a depth of two or three inches. The longer cultivation is continued the better will be the effect upon the trees. It should not cease in any case until they are well established and prepared to thrive without further attention.

Scattering or isolated trees can not usually be cultivated except by occasionally spading up the earth within a circle of a few feet around them. This is necessary in order to keep the grass and weeds from crowding them and retarding their growth.

The difficulty in tilling a school-ground plantation will come during the vacation period. That is the busy time of the year, when crops must be tilled and harvests reaped. Unless the person in charge is very watchful the plantation is sure to suffer.

Although artificial watering is not recommended, it is necessary to keep the soil of the plantation moderately moist. Sometimes a great deal of moisture can be added by conducting to the plantation the water that drains from adjacent slopes. A small trench made to correspond with the contour lines of a hill or slope will often gather almost all the surface-drainage water. In the Northwest, trees planted as snowbreaks a few rods from the north and west sides of the plantation will cause the drifts of snow to form just outside of the plantation. The trees will thus be

saved from breakage, and a helpful supply of moisture will be added at the edge of the plantation.

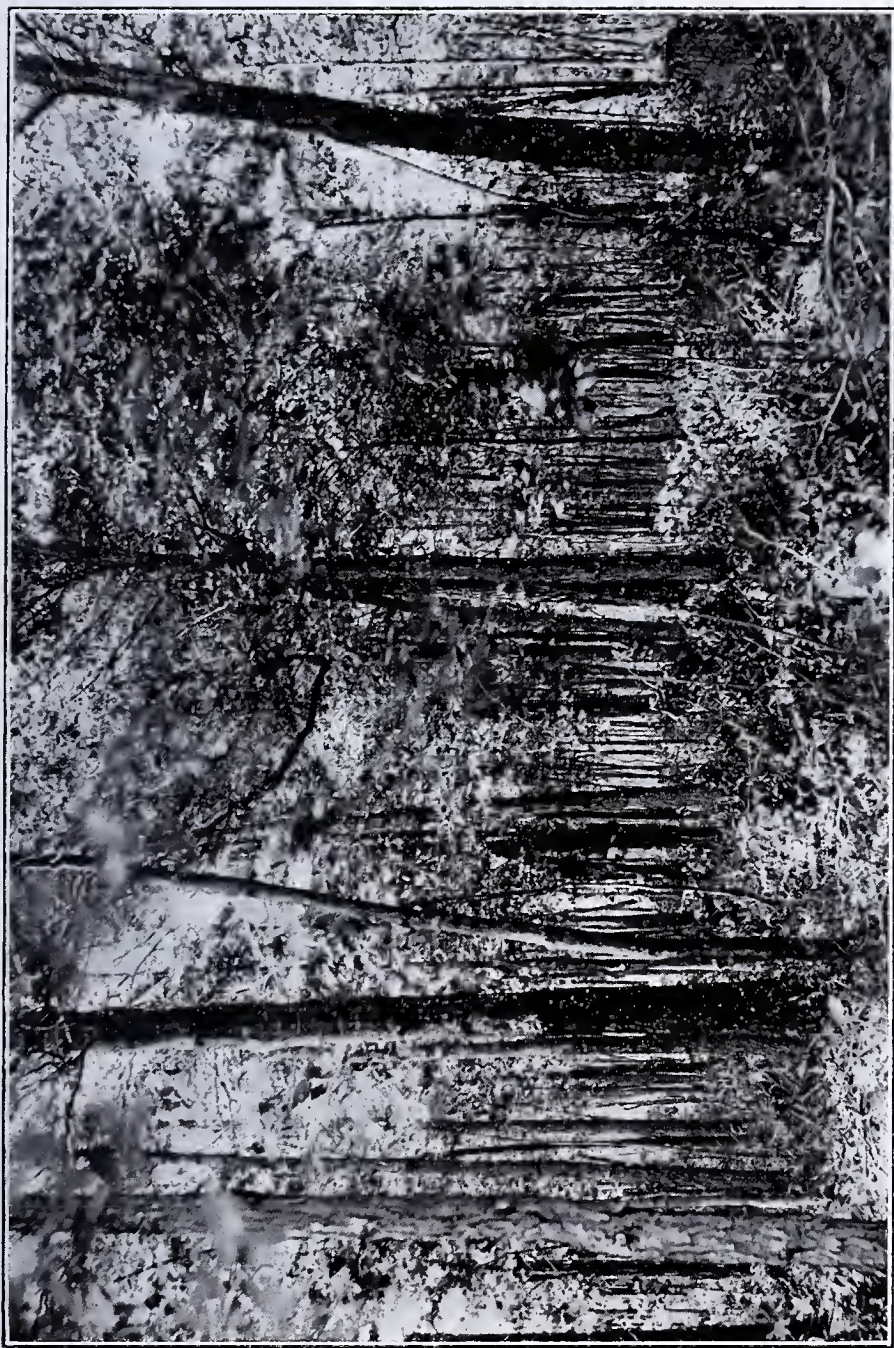
The responsibility will devolve upon the teacher to inculcate a spirit of respect on the part of the pupils for the plantation. The best way to do this is to make them feel a responsibility for its success. If they feel a personal pride in it, there is little danger of their giving the trees rough usage by bending or breaking them. —Farmers' Bulletin No. 134, U. S. Department of Agriculture.

SUGGESTIONS FOR FOREST CULTIVATION IN INDIANA.

The greater amount of the timber now growing in the State is second-growth hardwoods, either by sprouting from the stumps of the preceding trees which have been cut off, or by springing from seeds in the forest mold upon sunlight and air being admitted. The forms of the present forests are either wood lots or abandoned fields growing up and alternated by cleared fields, and will therefore require more careful cultivation because of the climatic exposures.

The sprout forests are inferior to those growing from the seeds, and less valuable trees may be expected from them. The reason for this is that the stumps from which the sprouts grow become decayed and, therefore, affects the tree growing from it. It is to this cause that many of the decayed and hollow trees, especially at the butt, can be attributed. It is to this same cause that many of the trees die at an early age, become infected with disease, and are eaten by beetles and borers more than other trees in the same locality. Each succeeding sprout growth will reveal more of these defects, because as the stumps decay more and are repeated they become weaker in vitality. It therefore stands the owner of a forest well in hand to anticipate these evils in the perpetuation of his forest by seeding it in conjunction with sprout cultivation.

In very old sprout woods it has been ascertained that the rate of annual decay often exceeds the annual increment, and as time elapses they become more ragged and open. It has been distinctly discerned that trees growing from stumps which were cut high and ragged are more defective than those growing from stumps cut low and smooth. The reasons for this are at once visible to the mind. Stumps cut high and ragged afford first, a chance for the sprouts to come out far above the ground and thus leave less chance to establish a root hold in the soil, and are, therefore, wholly dependent on the stump for nourishment; and, second, the ragged form of the stump affords greater opportunities for decay and thus destroys the chances of life to the tree growing from it.



A view of an Oak Forest at the Forest Reservation, Henryville, Indiana, showing its appearance after cultivation for future forest growth. All the weed trees are cut out, the lower limbs cut away and the brush leveled to the ground to form mold for holding the moisture and enriching the soil.

Stumps cut low and smooth obviate these difficulties and enhance the productiveness and promote the chances for permanent growth.

There are three phases of treatment which may be considered as the right thing to apply to make the forest tracts successful. They are known as improvement cuttings, reproduction cuttings, and restocking with either seeds or seedlings. The following points will prove to be the right things to emphasize in applying treatment that the best results may be obtained.

1. Proper cutting of the stumps in removing trees to insure the right conditions for sprouting and nourishment.

2. Careful thinning of the sprout and seedling growths to obtain the strongest, best trees for the permanent stand.

3. Right pruning of the trees selected to stand, in order to form correct boles.

4. Restock the scanty parts and the portions possessing undesirable trees with seeds or seedlings of the right kinds.

5. Protect the forest from injury by fire, grazing and ruthless destruction in cutting trees when removing them for use.

CUTTING FOR IMPROVEMENT.

Improvement cuttings mean the removal of such trees as are the least promising, most unlikely and undesirable, and such as hinder the right development of the best trees desired for the permanent stand. The thinning out to a proper number to afford the right chances of growing to the selected trees intended to form the forest. It does not have in it the idea of new growth, but simply the improvement of the existing stand of trees.

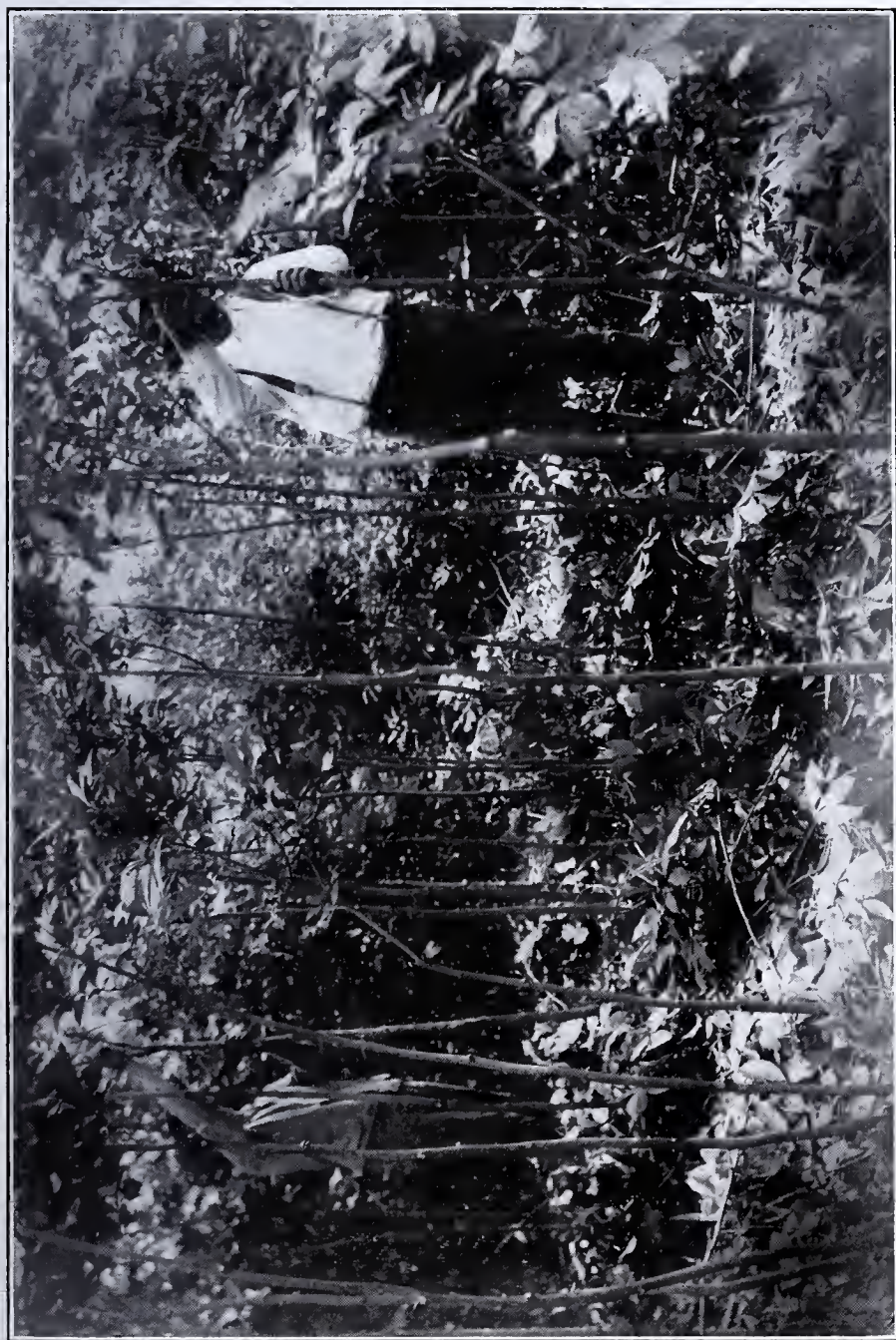
In the performance of this work judgment must be exercised not to cut out too much. A sufficient number should be retained to protect the soil from the sun and wind, which, if permitted too direct contact, will dry it out and hinder the trees from growing because of the lack of moisture and forest mold, extravagant branching and the springing up of weeds and grass to sap the substance from the trees. The growth of weeds and grass and the lack of moisture will also prevent young trees which might spring up from the seeds from doing any good to form the succeeding crop when the older trees are cut off. A good rule to follow in this would be to, first, remove the dead and dying trees; and, second, such stunted medium and undesirable kinds as is necessary to the

end sought. This plan will surely bear the stamp of utility, as the cutting out of the dead and dying trees will enable them to be used instead of remaining to decay and afford chances for a forest fire. Their removal heightens the advantages of growing to the standing trees. In some instances of wood lots which have never been thinned it will be found necessary to cut out the overtopping trees, as the young, healthy trees springing up beneath and hampered by their shade demand and justify release from their crowns. The individuals should give way to the many. Very frequently the cutting of those dominant trees gives the best results, as the young trees which they suppressed respond quickly to the conditions of light and soon fill the space made vacant.

There are two phases of improvement cuttings, the even and the uneven. The former has reference to cutting out all the trees down to a uniform size and repeating at periods of years (as every 15, 20, 30, or 40 years), depending on the wishes of the owner and the size of timber wanted. In most instances the time of repetition is about 20 years. The latter idea has reference to no uniformity of size or period of years, but the cuttings are made at any stage of growth when material is desired and the conditions demand that cultivation be instituted. The latter plan is such as will be found preferable for forests where there are annual demands made on the timber for economic uses. The owner in selecting trees to cut for his purposes will study his forest and make his selection with the view of improving it instead of haphazard careless cutting anything and anywhere.

CUTTING FOR REPRODUCTION.

Cutting for reproduction is the process of forest cultivation whereby a new stand of trees is sought to replace the ones removed. Trees are selected and cut at different places over the forest to suit the idea of the party who is reproducing it, and are cut in such a manner and with the thought that either a growth of sprouts or seedlings will put up, or both may be in contemplation. Such forest cultivation is not calculated to produce the required forest, but is the initial to it. A forest obtained by this method, unaided, is uneven and irregular in almost every feature and must be followed through by the improvement cutting process to result in a finally valuable forest. Every principle of it will reveal this.



A view showing a four-year growth of hickory and oak on an abandoned field and the manner of cultivation for a permanent forest. The stand shown is of natural forming from both seeds and stump sprouting.

The best trees are removed to cause the reproduction and the poor, undesired kinds left, which must be gotten out of the way by the latter process. A reproduction forest pure and simple is inferior.

It is therefore evident that these two distinct processes of forest culture must be co-ordinated to secure the final successful aim, and the points 1 to 5 previously enumerated are the essentials for emphasis.

CORRECT STUMP CUTTING.

The stumps should be cut as close to the ground as possible, that the sprouting will not occur too far above the ground and thus lessen the chances of the sprouts to establish a hold in the soil for nourishment. They should also be cut smooth and slanting, to allow the water to run off, instead of remaining to soak into and rot the stump, thereby affecting the chances of sprout-growth and their thrifty condition. The bark should not be torn and split from the stump, because such will lessen the opportunities for buds to form and thereby sprouts; besides, the conditions for decay are heightened.

There are two seasons considered as the right times to cut trees to secure the best sprout growth. They are the season of down-sap and the season of sap-flow. The time of the former is from October to February in this climate and the latter is from February to June. These limits are the maximum. It is not at all advisable to cut in the spring and early summer as the sprouts which may then be put out are tender and immature for the winter and the freezing so affects them that they usually die the following season, or if they continue to live they are more or less inferior because of the damage resulting from the winter on account of their tenderness. As to which of the two favorable seasons is the better I am not sufficiently informed to dictate; however, the following points will help owners to decide for themselves. The stumps cut during the sap flow season sprout surer and more numerous than those cut in the down sap season, but the abundance of the sprouts is detrimental because it requires more work and expense to thin them and the sprouts are weaker because of the number. The stumps decay sooner when cut in sap-flow, and this affects the permanent growth from them. The owner, if he be a farmer, finds his time occupied more with other duties in the



A Properly Cut Stump.



An Improperly Cut Stump.

sap-flow season, and will therefore not be able to devote as much time to the correct cutting.

The down-sap cutting fails in some instances to sprout, but the less abundance is very favorable, because less labor and expense is required in thinning and the sprouts put out earlier, are stronger and will mature better for the winter. The stumps season better against decay and consequently insure a stronger permanent growth to the forest.

In selecting trees to cut with the view of establishing a sprout forest it will be well to consider that old trees which are mature will not do much good at sprouting. The best results are obtained from trees from twenty to forty years old and in the best vital condition.

THINNING PROCESS.

This topic has been slightly mentioned under the topic, "Cutting for Improvement," but will be treated more fully. When the reproduction cuttings have been performed and the growth of the new forest is well established, thinning will become necessary, and the owner, to cultivate it, will want a definite plan of operation in mind. The following will be found a good course to follow:

1. Remove all the dead and dying trees.
2. Cut out defective trees, those possessing frog stools, canker, scars, hollows, girdles by fire and otherwise, or top dry, eaten by borers, bent and broken by snow, sleet or storms.
3. Take out those that are suppressed beyond recovery, those crowding the more thrifty ones and the large crowned trees that are holding back a strong undergrowth of seedlings, which if given their freedom would soon spring into valuable timber trees.

All of these classes of trees will, for fuel and other common uses, yield a value, if judiciously handled, commensurate with the labor and the investment, besides the satisfaction of carrying forward a systematic, aesthetic and valuable work.

When this thinning process has been well executed the stand of trees retained will be of the best quality and the proper quantity for the forest, and the cultivation for its future development will be only the cutting out which becomes necessary to retain it in prime condition. If the stand is thick, a few years growing will

require a second thinning which may call for the same or a different plan of operation from the first, of which the owner, if thoroughly in sympathy with retaining his wood lot, will ascertain for himself. For most of the ordinary forests the annual demands for fuel and timber for other uses of the farm will cause enough cuttings, if rightly applied, to properly develop the forest to the best stage of value and usefulness, which will be in time from forty to fifty years for large valuable timber. A complete harvest can then be made and the forest again renewed. Mill owners assert that a crop of good saw timber can be cut about every twenty years if the young forest is left to grow after a crop has been cut off. This is asserted by many owners and observers of tracts which were thoroughly cut off for saw timber and permitted to grow up again without cultivation. If proper culture had been given them the results might have been many fold more of value.

PRUNING FOREST TREES.

Pruning forests is not always right, but when it is done at an early stage of growth it is practicable. It will very materially aid to the best trunk formation. It is found to produce the best results if applied when the trees are from twelve to fifteen years old and younger, and is not too heavily done. The limbs should be cut off smoothly and as closely to the body of the tree as it can be done not to tear or disturb the bark on the body. The limbs are removed as high up as the woodman can execute the work well with an ax or pruning knife. When the pruning is performed in this manner the cuts soon heal over and no blemish is formed to injure the wood value when the tree is cut for saw timber. If the limbs are cut off a short distance from the body, the snag left dies and rots down into the body of the tree and forms a permanent blemish to the wood.

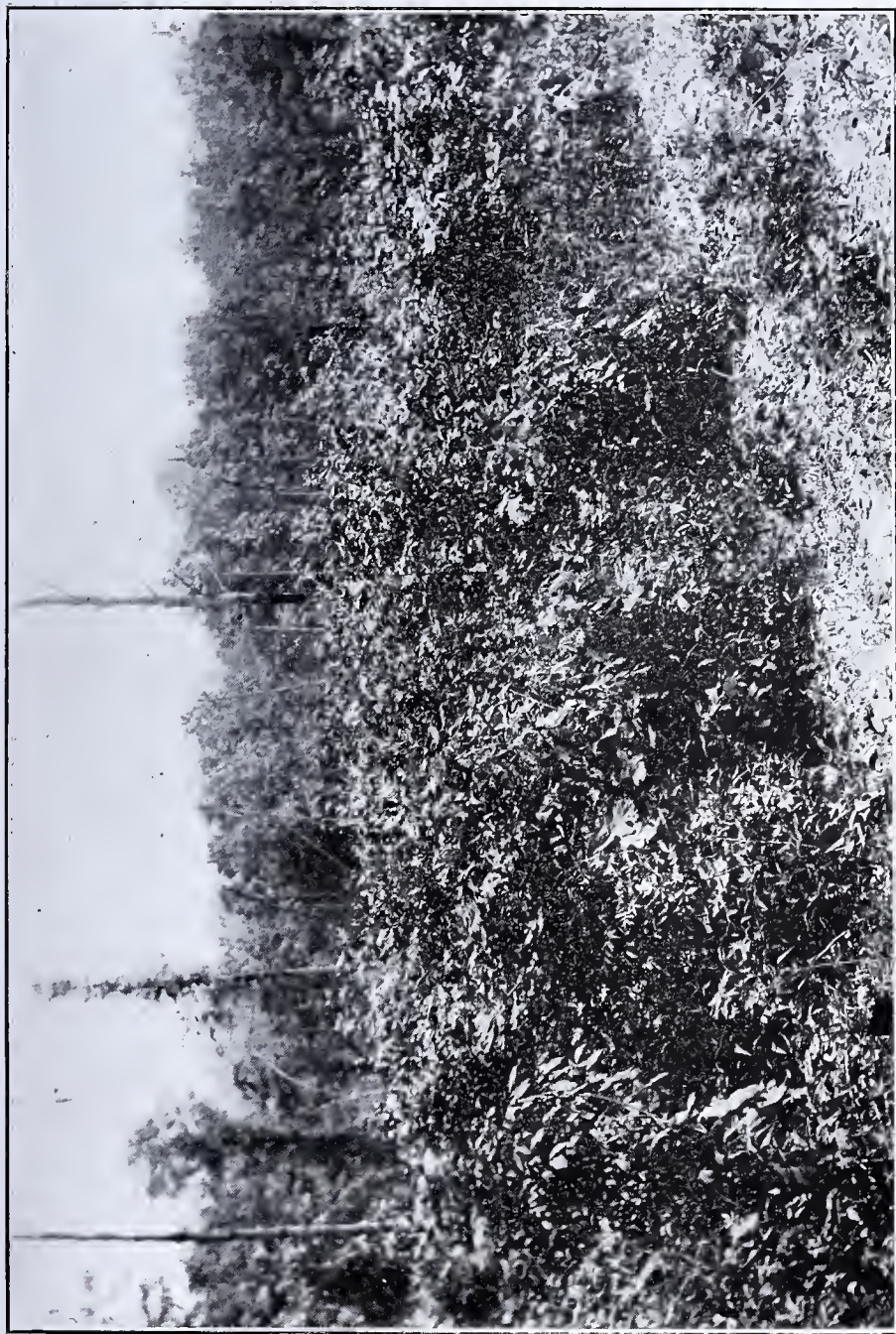
The best time to prune is from the last of June to the first of February. The sap will not exude from the cuts to attract insects, sprouts will not form at the junctures and the wood does not rot at the cut. If the pruning is done at the season of greater sap-flow all the above points are reversed.

RE STOCKING WITH SEED AND SEEDLINGS.

In a vast majority of wood lots there are patches, and in some instances the whole lot, where the stand of trees is scanty and most



Four Chestnut Sprouts springing from a young, vigorous stump of five inches in diameter.



A view of natural reforestation of one season's growth on a fire-burned area after being chopped off and allowed to grow up. The growth is of both seed and stump sprouting. In two more seasons it will be treated to the process of cultivation.

of the species are undesirable and consequently neither of the processes heretofore described would be resorted to for renewal. Restocking them with seeds and seedlings of the best kinds is the only method of renewing them to make them valuable. The few trees remaining, however, by the shelter of their crowns will aid materially in the restocking. In the wood lots of this type, there may be made, for discussion, two divisions, the extreme and the medium forms.

The extreme wood lot is one in which no trees of value remain to aid in the restocking process more than the shelter afforded by their crowns. The kinds and conditions are such that they would not do for seed trees to be used as nuclei from which to restock.

In addition to the above conditions a sod has formed over the area, and let it be understood that sod and forest can not exist at the same time and in the same place to a good degree of either. If the owner desires to renew a wood lot of this type, the sod must be thoroughly broken up in the spring or fall previous to restocking and allowed to decay and form a well pulverized surface to receive the seedlings. The "strip" plan can be used in this process. A part of the lot can be prepared and planted each year until the entire area has been gone over. The seeds may be gathered at any season in which they mature (see discussion of seeds) and can be planted at once on the pulverized soil either in rows or broadcast, or they may be stored till spring and then planted.

The distances for planting trees to secure the best results have not been determined, but the recognized ones are four to eight feet apart each way for row planting, so that cross cultivation can be performed. Promiscuous planting will not bear such close distances and the success can not be so assured.

The medium wood lot is one which possesses some good forest, but there are patches of scanty trees with sod formed alternating more or less over it. In many instances the trees remaining on the thinned places are of a good kind and can be used as seed trees from which to restock, and then removed to let the undergrowth advance unhampered. The "group" system can be used to restock in such lots. By this system the good trees are used as nuclei for restocking. The sod is broken as before described and the seeds are permitted to fall and become imbedded in the pul-

verized soil to spring forth as nature brings them. Effort may be made to extend the seeds as far from the trees as the quantity will permit, to secure a stand, or the seeds may be permitted to germinate in a mass under the tree and then be transplanted to other areas at a distance. There is seldom a year that such trees do not bear seed, but the sod formed under them prevents the seed from getting a germinating hold in the soil, or stock is permitted to eat them and thus destroy the chances of a new growth of trees naturally.

PROTECTION OF FORESTS.

Forests are the least protected against damage of any other form of property the owner possesses. Every year there occur in Indiana forest fires in great number. There is not a county in the State that is not the scene of annual forest destruction by fire. The sources of fires are locomotives, careless hunters and neglected brush fires from clearings. In almost every instance the damage is far greater than estimated if any thought is given to calculating the loss. In most cases no thought is given to the damage and but little effort is made to check the fire unless it promises to extend to other property. The only seeming effort made is to confine it to the forest area and let it burn itself out. If an actual estimate were made of the damage accruing from a medium forest fire it would astonish the owner and reveal to him that the loss of his crops and buildings would not exceed it, and yet he willingly permits it to burn unmolested in his timber and frequently gazes upon it with a pleased mien wholly unconscious of its damaging significance.

The injury done by a forest fire can not be estimated by the value of the trees that die directly, but the injury which is sustained by many that live on after the fire is such that they are made valueless. The fire burning for only a short time in the leaves and humus causes sap boiling wherever the heat comes to any extent in contact with the tree and in a short time the bark dies, falls off and the wood is exposed to die and form a rotten place in which borers and beetles form their attacks upon it. In after years when the tree is cut it is found to be hollow, worm-eaten and generally affected, rendering it of no consequence except for fuel. It is seldom that a sound forest tree is now found, which



A view of young forest devastation by fire which occurred on the new Forest Reservation.

It is estimated that 50,000 young trees were absolutely killed by this negligent fire.



A Sugar Maple showing the permanent injury from fire burning through the leaves and causing sap boiling, and the attempt to heal over.



A view of fire injury by burning brush in a forest, a thing which should never be permitted.

fact may be traceable to past forest fires. It is sincerely urged that all who are interested in the saving and the promotion of the forests will lend their efforts to guard against forest fires and to enforce the laws against all violations.

Wood lots surrounded by cleared land can easily be protected. If fire should by chance start in them it can promptly be seen and put out. If the forest is subject to danger from fires by its proximity to railroads or similar causes fire lines can be established and retained easily to prevent the fire from spreading beyond the limit. Strips on the danger points can be cleared of leaves, and rubbish, which will prevent progress. Regular lines may be made for such purposes and kept plowed up during the danger season. In case fire breaks out and no fire lines exist to check it, the thing to do is to make such lines at once and in such places as will check the fire from spreading. If no water is available to put out the fire, fresh dirt thrown into it will readily put it out. Back firing can be done to head off a fire where the means described can not be used. Judgment will reveal many simple ways to stop a forest fire without letting it burn itself out.

Young trees should be protected against stock, which browse upon them, gnaw the bark from the trunks, bend, break down, and otherwise destroy them. A forest can not be successfully renewed if stock is permitted to pasture therein until the stand is above their harm.

SEEDS AND SEEDLINGS FOR FOREST PLANTING.

The planting of new forests is a thing which will greatly concern the people of Indiana in the very near future. Without doubt it will command much attention in certain parts of the State where the conditions are better adapted to timber culture than most any other thing in which the people might engage. There are many ways in which such work may be performed, but the simplest and most effective methods of planting from seeds and by homegrown nursery seedlings are recommended as giving the best satisfaction. These methods are inexpensive, and make planting possible on a large scale with small means. The following discussions may suggest some things of value to guide those who wish to engage in planting.

SEEDS.

It is very important to procure and use only good seeds in planting. This is essential to secure a stand and to prevent a waste of time and labor. The quality of seed depends largely on its being perfectly matured, the size, the age and the location in which grown.

In the instance of one and the same species of seed, the larger, heavier and mature ones are better than the small weakly ones. None but the former should ever be selected, because they possess greater germinating power, are more vigorous against hindering conditions of every sort. They have a greater reserve of material to aid development, the same as good seed of wheat, corn or any other agricultural product. This fact may be traced on through the life history of the tree from such seed. In cases of tests the dominant tree grew from the perfect seed.

The quality of seeds can sometimes be tested by the external appearance, but not always. Good seeds fill entirely the outer shell, are of a live, rich color and smell strongly of the characteristic odor of the tree. In all cases of heavy seeds, where it is not desired to trust to the senses of touch, sight and smell, they

may be tested by throwing them into vessels of water, when the well-developed seeds will sink and the inferior ones will float.

The germinating power of seeds is greatest just when it has ripened. It may be retained for a time, according to the species, and in case of proper treatment can be retained in perfect vigor. Some seeds must be planted immediately upon maturing, while others can be kept for some months. It is well known from natural information that all seeds ripening in the autumn do not germinate till the next season. Under favorable conditions the seed may be planted in the fall as soon as they mature, but owing to climatic uncertainties it is better to store and plant in the spring. The best time for planting in the temperate climates is April and May.

That the late maturing seeds may be kept in good condition, they should be properly treated and stored through the winter by either the earth or cool dry processes, according to the requirements of the seeds. The nuts and acorns should be divested of the hulls and cups, the cones and pods should be dried and the seeds whipped out, or the seeds may be allowed to remain in them, and the fruits should be macerated and the seeds washed out. All those requiring earth storage should be reasonably cured in the open air and light (never by fire heat), and then stored.

The manner of storing in earth is very simple. Select a well drained site and excavate to a depth of eight or ten inches, and as large as required for the quantity of seeds. Place within the excavation alternately layers of seed and earth till all are stored, cover to a depth of five or six inches with dirt, arrange the drainage so no water will stand on the seeds, and let them alone to freeze and rot till time to plant in the spring. To store in boxes is very similar. Secure boxes of such size as are needed to hold the quantity of seeds in storage, fill the boxes with sand and seeds in alternate layers, bury the box in the soil on a well drained site as in the former case and let remain till time to plant. Another method is to arrange plank boxes on the surface and store the seeds in either earth or sand as before and allow them to remain till spring. It will be found necessary to guard against rodents destroying seeds in storage as well as after planting. Always store in sand if possible, owing to its being better both in results and for seed removal from storage.

When seeds are treated in the ways thus described, and if no water is permitted to stand on them, the weathering thus afforded them is the thing they need to soften the shells and insure prompt germination when planted. When the seeds are removed from storage they must be planted at once and not allowed to dry out, as that will destroy the life germ.

The trees, the seeds of which ripen from September to November, inclusive, and need such storage, are the following: Oak, hickory, walnut, locust, chestnut, plum, cherry, persimmon, dogwood, hackberry, beech, lin, osage orange, and black gum. The trees, the seeds of which ripen from August to November, inclusive, and need storage in a cool, dry, airy room, are the following: Canoe and sweet birches, catalpa, sassafras, ash, sugar maple, mulberry, sweet gum, poplar, cottonwood, cypress and pine. Those, the seeds of which ripen in May and June, and must be planted at once, are the following: Elm, red birch, red maple, and ironwood.

The trees from which seed should be gathered and the locality are two matters which should be considered. Though all aged trees may and can yield good seed as a rule, it is better to select seed from trees which are in the prime and vigor of growth and possessing full crowns. The seeds should be selected from a locality of the same soil and climate as the area to be planted, say some authorities, while others disclaim the idea and think that the same thing prevails in this as does for seed in agriculture, and that different soils and climate should be considered in seed selection. Seeds should be secured which are good and thrifty and from trees sound and in the best growing state, and I am of the opinion that the other facts will not count for much, though with the buying of seedlings it would be quite different.

The trees best to gather from, both for good seed and convenience, are those growing in the open. The seeds of the extreme early and late ripenings should not be gathered, but the middle maturing should be selected. The tree should not be cut to secure the seeds, but shake them down and let the tree remain.

When the right season and conditions of spring come for planting, the seeds can be removed from the storage and thrown into vessels of water to clean them and detect the bad seed before planting. The storing process usually reveals the inferior seeds

by their decayed and black appearance from the freezing and rotting effects of the storage, but the water test is a sure means of detecting faulty seed. If the seed are to be planted in a home nursery to grow seedlings for transplanting, the nursery site should be selected and prepared for the seed before they are taken from storage.

THE NURSERY.

The site for the nursery should be a well drained and protected, though not heavily shaded spot, and of good, heavy, rich soil. The ground should be well broken up the season prior to planting, and the process repeated at the time of planting. The soil for the nursery should be thoroughly pulverized. If the nursery is to be a small one for hand cultivation it may be plotted into compartments for different kinds of seeds and for conducting areas of transplanted trees for larger ornamental plantings. The compartments may be made into raised beds or left at a level, just as the owner determines, and may be made of sizes suited to the cultivation. The rows for hand culture may be made from 18 to 24 or 30 inches wide, though for hoe culture the distances need to be very much less than for horse and plow cultivation. The furrows for the seed may be made with any device that will answer the purpose. The seed in the rows should be planted at a distance of about two inches apart and should be covered with fine soil to a depth of about twice as deep as the seed is thick, and the dirt thoroughly packed upon them. Do not do this when the soil is likely to bake very hard. Broadcast planting may be done instead of rows if desired, though because cultivation can not be given the young trees it is not as successful as the former.

If the nursery is to be of considerable proportions, the rows should be made from three to four feet apart that they may be cultivated with the plow and horse.

For extensive forest planting the seedlings should be transplanted at the end of the second year, and those having grown best may be transplanted at the end of the first year to the forest. By transplanting at these ages all the labor, digging and planting, can be performed at much advantage over larger trees. Trees which are retained in the nursery for larger size to be planted for ornament should be transplanted at least twice at intervals of

two or three years. In transplanting the roots will necessarily be pruned, as will also the top, as both should always be kept in proportion, and this will cause a numerous fibrous root formation which insures better success in living when the tree is finally planted to the permanent place.

If the seeds are to be planted directly to the area intended for the forest and in the places where they will be left to grow into trees without transplanting, then the soil must be prepared to receive them.

SOIL PREPARATION.

The preparation of the soil for forest planting varies according to whether it is cleared or timber land. Cleared land is prepared for receiving the seeds in just the same manner it is for corn planting. It is well broken, pulverized and marked off into rows either one or both ways, as desired, though it should be marked both ways to admit of cross cultivation. (The distances apart at which the rows should be made is a matter not yet satisfactorily determined, but the usual distances are from four to six feet.) The seed are then planted in the checks and covered. This may be accomplished in any manner found best and convenient. After planting, the soil should be packed thoroughly by rolling it. Any soil that will admit of this manner of preparation should receive it. If the surface is such that it can not be thus treated, the seeds will have to be planted by any means to get them into the earth and sufficiently covered. A hoe, mattock, garden trowel, circular spade or pick may be found serviceable means. An apron sack may be made to carry the seeds by the planter.

The number of seeds to plant in a hill will depend on the character of the seed. Fifty per cent. is considered a good average for forest seed germination. If the seeds are carefully selected and stored a larger per cent. may be obtained; but under all conditions two to the hill should be planted, and if they germinate well it is better to have to thin than to replant. A good stand should always be the aim. The thinnings can be used to transplant elsewhere.

It is advisable with certain trees to at all times plant the seed in the place where the tree is to grow permanently, while with others it is better to grow the seedlings in the nursery and transplant, and still others are better grown from cuttings. The trees,

the seed of which should always be planted in the permanent place where the tree is to grow, are: Oak, hickory, walnut, chestnut and beech, though they can be transplanted at an early age with a little success. All others can be successfully transplanted from seedlings, especially when young and the conditions are anything like favorable. The poplars, willows and aspens are best grown from cuttings.

FOREST TREE CUTTINGS.

The time to make the cuttings is any time between the sap's going down in the fall and its coming up in the spring. The particularly best time is February and March. The cuttings should be made from one- and two-year-old growths of branches and ranging from one-quarter to one-half inch in diameter.

A convenient length for cuttings is eight to twelve inches. The cutting should be done with a fine sharp instrument, so as not to split the wood. The cuttings should be tied in bundles of fifty to one hundred each, the large ends all tending the same way, and the bundles then buried to prevent their drying out. They should be buried at least ten to twelve inches deep, to prevent drying. Freezing will not hurt them.

Cuttings should be set in the spring, and the ground should be prepared same as for seed if can be. They should be set in the permanent places, the same distance apart as when planting the regular forest, four feet apart. They may be set straight or slanting, as is convenient, and the earth firmly packed around them. Not more than two inches of the cutting should be left out of the ground after setting.

They should be cultivated well to keep weeds and grass down and the soil loose for growing. Where the soil can not be well plowed and pulverized a good method to set cuttings is to use a "dibble" in making openings in the ground. This instrument is handy, cheap and the best to use in such cases.

SEEDLING TRANSPLANTING.

The preparation of the soil for planting seedlings is the same in all instances as has been given for seed planting. The making of excavations to receive the trees is the thing most difficult, to not impede rapid progress. If the trees are large and have spreading roots, the places must be made large enough to receive the roots without cramping them. It is better, therefore to transplant the seedlings at an early age, in order to lessen the work as well as to insure better results of growing. Most seedlings at the ages of one or two years do not possess much root system, simply a straight stem with small hair fibres. If the ground is well prepared the planter can make the holes with a sharpened handspike by jabbing it into the loose soil and prying in all directions. If it can not be performed in this manner a circular spade, dibble or other implement adaptable to make the small holes necessary can be used. If the former plan is followed the planter can quickly make the holes, insert the slender root and firmly press the dirt around it. In all instances the dirt should be pressed thoroughly around the roots so that no air remains around them. To this cause may be attributed the death of many trees planted. In some instances a spade was inserted into the soil and the earth pried apart, the tree root inserted, the spade removed and the earth stamped firmly upon the roots. For planting the small seedlings various methods may be employed to make the excavations successfully.

If larger trees are planted, more work and effort will be required to make the holes and to plant the tree properly.

The digging of the seedlings should be performed in a way not to injure them. In a small nursery, and when the trees are young, a sharp spade can be used by cutting along both sides of the rows and then lifting the trees out carefully. At all times mangling the trees should be avoided. It is not essential to prune unless the trees should become broken, when they should be pruned smoothly.

The trees may be dug in the fall and heeled over winter for early planting in the spring. Young trees in this climate should not be planted in the fall. The winters are too severe on them in their newly planted condition. The same thing is also true, in my judgment, for larger trees.

The trees can be heeled in in the cellar by keeping moistened dirt over the roots. The usual method of heeling trees is to dig a trench deep enough to bury the roots and the greater part of the bodies of the trees. Extend the trench east and west, the south bank sloping at an angle of about thirty degrees. Place the trees in the trench in single layers with the tops to the south and cover each layer with fresh earth. It is advisable to leave only the branches exposed. They may be left in the trench till they are taken out for planting. Select the site for the trench where the drainage is good.

When removed for planting, the roots should be plunged into a vessel containing a mixture of clay and water formed into a slush. The same thing should be done to the seedlings when taken from the nursery unless they are immediately planted or heeled in. The roots of any tree which it is intended to transplant should never be allowed to become dry.

The distances at which trees should be planted are 4, 5 and 6 feet apart for regular forest plantings, and should be in rows both ways to admit of cross-cultivation. They should be plowed or cultivated in some manner to keep down the weeds till they are large enough to survive by themselves.

The close planting enables them to soon shade the ground and thus conserve the moisture to them. Besides, it aids in natural trimming and long, straight trunk formation. Successive thinings will be necessary when they begin to crowd and smother out.

The principle of tree growth is that if the tree is grown in the open it branches and forms a shade tree. The growth goes to limbs and branches instead of body formation. If it is crowded, it goes up in search of light, does not branch, and consequently a good trunk is formed to make the tree valuable.

HOW ARBOR DAY ENCOURAGES FORESTRY.

GIFFORD PINCHOT, FORESTER, U. S. DEPARTMENT OF AGRICULTURE.

The direct results of Arbor Day are seen in the trees and shrubs which add comfort and beauty to the school-grounds and give cheerfulness to the entire surroundings. In themselves these results are sufficient reward for the most painstaking efforts. Yet there are other results.

To my mind, the indirect results of Arbor Day are farther reaching and more important than the direct results. By indirect results I mean those arising from the knowledge and love of trees gained by the pupil in the well-directed school where Arbor Day is duly celebrated. The proper observance of the day is necessarily associated with instruction about trees and their usefulness to mankind. This instruction is sure to bear fruit in due time. From the children taught to observe and respect trees and forests, will grow men and women who will cordially support and practice conservative methods of forestry.

Indeed, since the inauguration of Arbor Day, there has already been a widespread movement in America both toward better knowledge and better practice of forestry. Many universities and agricultural colleges have organized forest classes, and three forest schools have been started. These classes and schools are crowded with students. The enthusiasm of young men for the study of forestry is growing with wonderful rapidity. During the year 1901 there were over 700 applications for position of student assistant in the Bureau of Forestry, nearly all of which are from college and university men. Forestry is taking firm hold upon the young men.

It is also attracting the attention of the owners of forest land who are seeking the highest profits from their investment. They are finding that a sustained moderate yield from a forest tract is better than one rich harvest that leaves both the forest and the land valueless.

The National Government and some of the States have taken important steps in forestry in the last few years. New York has forest preserves in the Adirondack and Catskill mountains of over 1,300,000 acres, on which the forest is being protected for future use. Pennsylvania, Connecticut and Michigan are following the example of New York. The National Government has forest reserves amounting to over 46,000,000 acres. Almost every year sees this amount increased. This immense area will ultimately be managed so as to secure the greatest possible sustained yield of timber.

How far the interest and activity in forestry are traceable to Arbor Day influence and school instruction cannot be told, but it is sure that they have done much to show the need of better care and use of the forests, and to emphasize the necessity of a system of management by which the forests can be made to yield their best service to man.

A WOODLAND EPISODE.

WRITTEN FOR WISCONSIN ARBOR AND BIRD DAY ANNUAL
BY C. H. SYLVESTER.

It was a case of love at first sight but none the worse for that. Everyone who saw them said they were perfectly fitted for each other and hoped they would make a match of it. She was demure and dainty but faithful and affectionate; he was gay and festive but withal devoted and industrious. It is true he was fastidious in his dress and loved fancy coats, while she wore gray with just a touch of color at the throat. Moreover, he wanted a new suit each spring, while she was content with the same style the year round. Both came of good family, had attended the same school and mingled in the same society. So all their friends joined in congratulations when he married her before the very eyes of several other lovers.

They were really very sensible people and wasted no time on a long and tiresome wedding journey but set about at once to select a site for their home. He had during his courtship looked up a number of likely places and they were not long in choosing a lovely spot on the shore of a beautiful lake where nature had grown trees and planted shrubbery with a personal view to their coming. Little or no clearing was necessary. They could begin at once to build their house with the certainty that when it was done it would be screened from the road by trees and vines and would have the retirement and privacy they both sought. Nevertheless, it was by way of the road that trouble came.

The house was built on a plan that the two designed and about which they never for a second disagreed. From the moment that the first dry twigs were laid across the little branches and fastened securely in place till the last hair was smoothed down at the top of the rounded walls,—even while the soft interior furnishings were being selected and arranged for comfort and warmth, there was never a note of discord. And when all was done and she nestled snugly down filling the whole house comfortably, he gently pulled a leaf in place to protect her from the sun and flew away

shelterless but happy. Even then there was no shadow of the tragedy over them.

One, two, three, the little white eggs were laid in the nest—translucent white, white like alabaster but so delicate that only a mother could be trusted to handle them. The happy young couple spent many an hour in long excursions through the wood looking for food and chirping merrily when they found it. They talked of the past and the future and laid plans for the education of their family. But always when night came and often during the day they returned to their home with joy in their hearts. One egg more was needed and then she knew that for a long, long time the gay woodland excursions must be given up for quiet days upon the nest. In another day she would begin her retirement. But just there the first trouble came along the road.

It really was not much of a road, it was only a path made by cattle originally. This time the trouble came in a form innocent enough. It was only a cow that walked lazily along pulling up the rich grasses that bordered the path. With her were two or three brown birds that hopped along in front or sometimes perched upon her back. One of these left the cow for a little while near the nest of our happy couple. And that was the trouble.

When the young bird came home that night she flew straight to the edge of her nest. Then her husband who had gone to the lake for a last drop of water was startled by his wife's voice raised in sorrow and anger. He flew to her side at once but was himself too startled to speak. There among the delicate translucent eggs they were so fond of was a larger, coarser thing; an ugly egg, no decent bird would have in its nest. But surprise and anger soon gave way to patient endeavor and far into the night the two labored unavailingly to cast out the intruding egg. It was too heavy and the walls of the nest were too steep. In their efforts one of their own fragile eggs was broken and their house soiled and disordered. Weary and discouraged they finally settled down on a twig and slept till the sun came up.

The sun is a great comforter, and though when the gentle couple first viewed their wretched home they thought of giving up in despair, yet they soon felt good cheer coming back to their little hearts. They so loved the beautiful spot they could not think of leaving it. The season, too, was advancing and they

knew no time should be lost. It was almost too late to build a new nest and no other spot was half so good as this which they had selected when first they were wedded. They thought it over and talked it out with no disagreement, each giving something to the plan, neither taking anything from it. It was simple after all. Cover over the two little eggs, the fragments of the third and the big hideous fourth one with a thick, close new floor. Then raise the sides of the nest further, round them off and finish the new one as the old one had been lined. Of course, that dark crypt underneath was not pleasant to think about, but birds are not the only people that are sometimes compelled to bury their past.

The work went on, not so gaily this time, but patiently and gladly. The nest was finished and the new eggs were laid—three of them now. There was greater anxiety this time and the woodland excursions were shorter and less like pleasure jaunts. After three eggs were laid, one of the birds was constantly in sight of the nest. But the cow and her lazy-winged attendants loved the shaded path by the water and strolled that way frequently. Again one of the cowbirds flew into the brambles. The bridegroom saw her enter and hastening in attacked her vigorously. But do what he would the lazy bird accomplished its purpose and once more a big ugly egg lay among the delicate porcelain three. What a discouraged pair sat by the nest that night as the sun was going down. It was too late in the season to make a new nest, they were not strong enough to throw out the big egg, and a third story to the house was not to be thought of. One of two things they could do. They might abandon the nest entirely and go through the year a childless couple. On the other hand, they could adopt the intruder, protect it, nurse it, and work hard enough to feed the monster and their own little ones. Parental instinct was strong and they chose the latter course. The lady warbler went patiently upon the nest and sat there day after day though the big egg made her uncomfortable and she felt all the time that it was getting most of her warmth.

Perhaps they were a foolish pair to live on at the old home, but you must remember how beautiful it was there by the lake, and how they loved the dense shrubbery and how fondly they hoped for their young. The only thing they forgot was the fatal

path; and along that, dire disaster was coming to them a third time.

It came slowly as trouble comes to humans; it seemed to play with the little couple and lead them to think that all was well. It started a long way off, too, this trouble. Somewhere in the office of a millionaire railway manager a new road was projected, a road to take pleasure lovers from the city out to the country for a rest. That is all well enough of itself, but the railway magnate ought to have thought of a little pair in the bramble bush. But he didn't or if he did, he laughed at the idea. No one said that city children should be kept at home on their own pavements where they can do no harm in the black scrubby trees that the birds won't nest in. I haven't said a word about myself so far, but here's where I come in to this really true story. That railway was built and one hot afternoon I boarded a train and went out to the lake to spend the night at a lakeside hotel. The next day I walked along that path—the very one along which trouble came to the weary little nesters.

I was thinking of the many happy days I had spent in the wild woods and wondering why I ever consented to shut myself up in a city when a chorus of shrieks stopped me in my tracks. There was no mistaking them—they were heart-breaking shrieks—shrieks that meant the loss of home and children—the loss of more than life. What if they were but the shrieks of birds? There was agony in every utterance, heartbreak in every note.

I hurried ahead and there the whole pitiful tragedy was revealed. The beautiful location, the charming scene, the perfect little home with its basement horror just discernible through a rift in the side; above, the empty nest; two pretty little birds, crying, protesting, begging, scolding and weeping again; two broken eggs on the ground, each of which disclosed a dead birdling; and last a great, ugly city boy with a fiendish grin on his cruel face. He had a little egg in each hand, one egg cracked, the other dented. In the nest was nothing but the lazy bird's unwieldy and unwelcome gift. Perhaps I said something—I'm not sure, but I think I didn't dare to speak. I remembered two things; first, that I had made a collection of birds' eggs once myself; and second, I knew the boy in the city for a hardworking,

gentlemanly fellow who would not intentionally do a cruel or unkind thing. Besides he wasn't really ugly, nor cruel, nor ill-kept. He was just a boy and he didn't know. But something was terribly wrong somewhere. Two happy little lives were broken and ruined, four little bodies were cold and dead. Somebody, sometime had been terribly to blame—and it wasn't the boy altogether for he certainly didn't understand.

THE BIRDS AND THE TREES.

BY MABEL OSGOOD WRIGHT.

It was May Day. Half a dozen birds had collected in an old apple tree, which stood in a pasture close by the road that passed the schoolhouse; some of them had not met for many months, consequently a wave of conversation rippled through the branches.

"You were in a great hurry, the last time I saw you," said the little black and white Downy Woodpecker to the Brown Thrasher, who was pluming his long tail, exclaiming now and then because the feathers would not lie straight.

"Indeed. When? I do not remember. What was I doing?"

"It was the last of October; a cold storm was blowing up, and you were starting on your Southern trip in such a haste that you did not hear me call 'good-bye' from this same tree, where I was picking insect eggs that expected to hide safely in the bark all winter, only to hatch into all kinds of mischief in the spring. But I was too quick for them, my keen eyes spied them and my beak chiseled them out. Winter and summer, I'm always at work, yet some house people do not understand that I work for my living. They seem to think that a bird who does not sing is good for nothing but a target for them to shoot at."

"That is true," said the dust-colored Phœbe, dashing out to swallow a May Beetle, which stuck in her throat, causing her to choke and cough. "I can only call, yet I worked with the best for the farmer where I lodged last year. I made a nest on his cow shed rafters and laid two sets of lovely white eggs, but his boys stole them, and that was all my thanks for a season's toil."

"Singing birds do not fare much better," said the Thrasher. "I may say frankly that I have a fine voice and I can sing as many tunes as any wild bird, but children rob my nest, when they can find it, and house people drive me from their gardens, thinking I'm stealing berries."

"They treat me even worse," said the Robin, bolting a cut-worm he had brought from a piece of plowed land. "In spring

when I lead the Bird Chorus night and morning they rob my nest. In summer they drive me from the gardens where I worked peacefully, and in autumn, when I linger through the gloomy days, long after my traveling brothers have disappeared, they shoot me for pot-pie!"

"It is a shame!" blustered Jennie Wren. "Not that I suffer much myself, for I'm not good to eat, and I'm a most ticklish mark to shoot at. Though I lose some eggs, I usually give a piece of my mind to any one who disturbs me, and immediately go and lay another nest full. Yet I say it is a shame the way we poor birds are treated, more like tramps than citizens, though we are citizens, every one of us who pays rent and works for the family."

"Hear, hear!" croaked the Cuckoo with the yellow bill. He is always hoarse, probably because he ate so many caterpillars that his throat is rough with their hairs. "Something ought to be done, but can Jennie Wren tell us what it shall be?"

"I've noticed that most of the boys and girls who rob our nests and whose parents drive us from their gardens go every day to that square house down the road yonder," said Mrs. Wren. "Now, if some bird with a fine voice that would make them listen could only fly in the window and sing a song telling them how useful even the songless bird brothers are, they might treat us better and tell their parents about us when they go home."

"Well spoken," said the Robin, "but who would venture into that house with all those boys? There is one boy in there who, last year, killed my mate with a stone in a bean-shooter, and also shot my cousin, a Blue Bird. Then the boy's sister cut off the wings of these dead brothers and wore them in her hat. I think it would be dangerous to go in that schoolhouse."

"The windows are open," said the Song-Sparrow, who had listened in silence. "I hear the children singing, so they must be happy. I will go down and speak to them, for, though I have no grand voice, they all know me, and perhaps they will understand my homely wayside song."

So the Sparrow flew down the road, but as he paused in the lilac hedge before going in the window, he heard that the voices were singing about birds, telling of their music, beauty, and good deeds. While he hesitated in great wonder at the sounds, the

children trooped out, the girls carrying pots of geraniums which they began to plant in some beds by the walk. Then two boys brought a fine young maple tree to set in the place of an old tree that had died. A woman with a bright pleasant face came to the door to watch the children at their planting, saying to the boys: "This is Arbor Day, the day of planting trees, but pray remember that it is Bird Day also. You may dig a deep hole for your tree and water it well, but if you wish it to grow and flourish, beg the birds to help you. The old tree died because insects gnawed it, for you were rough and cruel, driving all the birds away from here about and robbing their nests."

"Please, ma'am," said a little girl, "our orchard was full of spinning caterpillars last season and we had no apples. Then father read in a book the government sent him that Cuckoos would eat the caterpillars all up, so he let the Cuckoos stay, and this year the trees are nice and clean and all set full of buds!"

The Song-Sparrow did not wait to hear any more, but flew back to his companions with the news.

"I shall put my nest under the lilac hedge to show the children that I trust them," said he, after the birds had recovered from their surprise.

"I will lodge in the bushes near the old apple-tree," said the Cuckoo; "it needs me sadly."

"I will build over the schoolhouse door," said the Phoebe; "there is a pea field near by that will need me to keep the weevils away."

"I think I will take the nice little nook under the gable," said Jennie Wren, "though I need not build for two weeks yet, and I have not even chosen my mate."

"I shall go to the sill of that upper window where the blind is half closed," said the Robin. "They have planted early cauliflower flowers in the great field, and I must help the farmer catch the cutworms."

"I will stay by also," said the Woodpecker, "I know of a charming hole in an old telegraph pole, and I can see to the bark of all the trees that shade the schoolhouse."

Just then a gust of wind blew through the branches, reminding the birds that they must go to work, and May passed by, whispering with Heart of Nature, her companion, about the work that

must be done before June should come;—June with her gown all embroidered with roses and a circle of young birds fluttering about her head for a crown.

“Dear Master,” May said, “why am I always hurried and always working? I do more than all other months. July basks in the sun, and August sits with her hands folded while the people gather in her crops. Each year March quarrels with Winter and does no work; then April cries her eyes out over her task, leaving it dim and colorless. Even the willow wears only pale yellow wands until I touch them. The leaf buds only half unfold and the birds hold aloof from the undraped trees; see, nothing thrives without me.” And May shook the branches of a cherry tree and it was powdered with white blossoms.

“Nothing grows by or for itself,” said Heart of Nature, tenderly. “The tree is for the bird and the bird for the tree, while both working together are for the house people if they will only understand me and use them wisely. Never complain of work, sweet daughter May. Be thankful that you have the quickening touch, for to work in my garden is to be happy.”

Then the Song-Sparrow caught up the words and wove them in his song and carolled it in May’s ear as she swept up the hillside to set the red-bells chiming for a holiday.

CHILDREN'S CAPABILITY IN IMPROVING SCHOOL GROUNDS—UNCLE JOHN'S MESSAGE.

SUGGESTED FOR ARBOR DAY ANNUAL BY JOHN W. SPENCER, SUPERVISOR
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For many years I have heard the cry of public speakers and read the plea of writers for the improvement of school grounds. As a rule, both lecturers and essayists have been occupying the position of human guide posts that stand along the path of life showing others the way, but taking no steps in the direction they indicate. From careful observation I have learned that the greater portion of the work of making school grounds better is being done by children under the inspiration of teachers. I have a firm conviction that children can do a great deal of useful work if only they have the proper encouragement and tasks be fitted to their hands. These two points are fundamental for successful results in all children's work—appreciation of their efforts and the opportunity to break the bundle of sticks one piece at a time.

It is true that children are quickly discouraged, but it is easier to cheer a dozen youngsters than one grumpy adult. In matters of appreciation, praise them for the effort they have shown rather than nag them because they have failed to attain perfection. A state of excellence will come only by repetition. It is unreasonable to expect children to vault into it.

Back of the children must be a heaven-born teacher, God bless her! Like the children, she, too, will enjoy appreciative words from the patrons of the school, the school commissioners and the public press. Appreciation is powerful in getting things done. It can give a charm even to drudgery. I doubt whether the President of the United States would care to retain his high and honorable office if his efforts were to receive the cold indifference that is too often shown our teachers.

I am being asked constantly for specific directions how to begin; what to do; how much to do. I have listened to plans imported from Europe which, while perfectly consistent with the

circumstances existing in France and Germany, would be unsuccessful under the condition of affairs in our own country. I stand firmly for a thorough study of American conditions, after which we can fashion for ourselves an American method independent of all foreign nations. It is not necessary for us in the State of New York to hoist an umbrella every time we think it may be raining on the other side of the Atlantic.

The specific things that should be done depend entirely upon circumstances. Scores of school buildings and grounds appear to have not a friend in the whole wide world and are as pathetic as a tramp cat that has been pelted with stones and clubs and scatted and chased by dogs through all the drains and culverts of the town. In a case of this sort a little care will make a very noticeable improvement. Do not fall into the error of thinking that until you are able to do something heroic nothing is worth while. To wait for such an opportunity may be to put the work ahead so far that your interests will be transferred from the school grounds to a plot in the cemetery. Tidiness, "slicking up," should precede all other things, even on grounds laid out on the principles of the most accomplished landscape gardeners. A clean face is more to be admired than purple and fine linen. Good grooming is better than fine raiment.

A well kept woodpile is one step to be recommended. Raking together the scattered papers, pie crusts and other evidences of lunches is another. Boys and girls delight in making a bonfire of the stuff. If the children are obliged to go ankle deep in the mud in getting in and out of the schoolhouse, a plank walk would deserve special mention in the local paper. The expense for the material has sometimes been provided by teacher and pupils giving a school entertainment and such an enterprise might help the teacher to get a better paying school the following year.

Some school grounds are well supplied with fine trees and many other features that go far toward making a pleasant setting for the schoolhouse. In such cases, care must be taken lest too much planting be done and the place be made to look fussy, not unlike an overdressed woman.

I am a strong advocate of children's gardens of summer annuals, but I would locate them at the homes of the children where the needs of the plants may be under watchful eyes each day and

where the refining influence of the flowers will reach the family rather than waste itself on the deserted school ground during the three months of the long summer vacation.

Hardy shrubs, perennials and bulbs I would plant in greater abundance than is generally practiced. No mistake can be made if these are set out along the sides and at the back of the grounds. This arrangement is practical even in playgrounds.

The above figure will give an idea of marginal planting. The method embodies a framework of which the school building may be the centerpiece, a principle very dear to the landscape gardener.

The following is a list of hardy shrubs from which a selection may be made: Smoke tree, mock orange, Japan quince, lilac, Rose of Sharon, althea, snowball, flowering currant, roses, weigelia, flowering almond and hydrangea.

These may be judiciously grouped at the two sides of the grounds, in the angles of the building, and in some cases at the back. Let each child select a group to be known as his own, that he may realize the pride of ownership and receive due praise or discredit, as the case may be. The owner of each group should be encouraged to spade and cultivate around each shrub a circle of from two to six feet in diameter. In this circle perennials may be planted. I have seen fine lily-of-the-valley growing beneath Japan quince. I have also seen sweet William and perennial phlox growing about a lilac bush. This spring at my farm home, I hope to see some daffodils and tulips blossoming beneath some old fashioned roses that I have tended many years because they were once my mother's.

The following is a "menu" of hardy perennials suitable for planting as described above: Bleeding heart, sweet William, fleur-de-lis, hollyhock, lily-of-the-valley, ribbon grass, plantain lily and the entire list of fall bulbs.

I have previously spoken about fashioning work to fit the children's hands. Child sentiment, like public sentiment, must be duly considered if we would make it available to our purpose. Tasks must be put to them in the light of an opportunity to display their progressive spirit for public improvement. Let each allotment be no more than can be properly cared for under spells of snappy enthusiasm.

PLANT FRUIT TREES.

In many European countries it has been the custom for centuries to plant a choice nut tree in commemoration of the birth of a child, and often this is repeated on each succeeding birthday. The results of such a practice are partly seen in the millions of bushels of these nuts produced in those countries for home use and export. This country alone imports annually over twenty millions of pounds of these foreign growing nuts. With these facts staring us in the face, we may well ask, why should our roadsides be encumbered and shaded with trees yielding nothing in the way of food for either man or beast? When it would be just as feasible to plant choice nut trees, which would soon give their owners a crop that could be sold in the markets of any city or village, besides making the highways "pleasant ways" and especially for the small boy and his sister, who are always blessed with a good appetite, on their way home from school.

It has been suggested, that at least one choice nut tree be planted on next Arbor Day in the school grounds of every district in this State. At the same time it should be impressed upon the minds of the children, and every person present that these, if properly guarded and cared for, will remain living, and fruitful memorials of their kindness and forethought for many decades, and perhaps for many centuries.

Fruit trees along the highways in Belgium made a return of two million dollars (\$2,000,000) for the year 1898.

SHADE TREE PLANTING ASSOCIATION.

As an excellent means of securing the planting of shade trees, it is suggested that a "Shade Tree Planting Association" be organized in each school district in the county, for the purpose of securing the planting of trees along all the vacant roadsides in the district. Unless the grown-up people of the district shall promptly move in this matter, let the association be formed by the school children of the district, both girls and boys. They, of course, will commence the work by planting trees around their own school house. They might not, themselves, be able to pull up the trees in the forest, but they could readily get their big brothers and kind fathers to do this for them. All the boys, both great and small, could take part in digging the holes and planting the trees, and the girls could direct the trimming of them, and so all, even the smallest pupil, will have done something towards this beautiful work. When this shall have been done, the association might have a celebration, to which any person residing in the district shall be made welcome.

Next it will be in order, if there be a church or a public square in the district, whose grounds are barren of trees (as such are apt to be) for the association to get up another "bee" for their adornment. And when the school grounds and the church yard have been thus beautified, and the boys and girls shall have had the good time consequent thereto, then the association might send its committees canvassing from house to house through the district, until each land owner shall have given a positive promise, that at the next tree planting season his farm fronts shall be supplied with the requisite shade trees.

ARBOR DAY.

'Tis said that he has done some good
 On life's eternal shore,
 Who makes two blades of grass to grow
 Where one had grown before.
 Much better, then, is he who plants
 Within the arid zone,
 And makes a giant tree to grow
 Where none before had grown.

Behold them in Nebraska
 Upon the prairie plains,
 Great groves of trees—man's planting.
 Their presence there explains—
 A shelter from the north wind
 When boreas thundered forth,
 A shield against the hot blasts
 That swept up from the south.

They planted them for shelter
 For crops and lowing herds;
 They planted them for beauty,
 And homes for singing birds.
 The good J. Sterling Morton,
 Remembered be for aye!
 His noble mind and kindly heart
 Bequeathed us Arbor Day.

Great oaks upon the mountains
 Destined to sail the seas,
 We take from Nature's storehouse
 And use them as we please;
 They fight for us our battles
 And breast the ocean's foam,
 And planted in our dooryard
 They beautify our home.

And straightway feathered songsters,
 With throats that burst with glee,
 Make their abode and warble there
 An anthem for the free.
 We feel a touch celestial
 Reanimating clay,
 O spare the birds! O plant a tree
 On every Arbor Day!

—Will C. Myers, Gilman, O.

THE BRAVE OLD OAK.

A song to the oak, the brave old oak,
 Who hath ruled in the greenwood long;
 Here's health and renown to his broad green crown,
 And his fifty arms so stroug.
 There's a fear in his frown when the sun goes down,
 And the fire in the west fades out;
 And he showeth his might, on a wild midnight,
 When the storms throughout his branches shout.

Then here's to the oak, the brave old oak,
 Who stands in his pride alone;
 And still flourish he, a hale, green tree,
 When a hundred years are gone.

In the days of old, when the spring with cold
 Had brightened his branches gray,
 Through the grass at his feet crept maidens sweet
 To gather the dew of May;
 And on that day to the rebec gay
 They frolicked with lovesome swains;
 They are gone, they are dead, in the churchyard laid,
 But the tree, it still remains.

Then here's to the oak, the brave old oak,
 Who stands in his pride alone;
 And still flourish he, a hale, old tree,
 When a hundred years are gone.

He saw rare times when the Christmas chimes
 Were a merry sound to hear,
 When the squire's wide hall and the cottage small
 Were filled with good English cheer.
 Now gold hath the sway we all obey,
 And a ruthless king is he;
 But he never shall send our ancient friend
 To be tossed on a stormy sea.

Then here's to the oak, the brave old oak,
 Who stands in his pride alone;
 And still flourish he, a hale, green tree,
 When a hundred years are gone.

—Henry Fothergill Chorley.

THE ACORN.

"Little by little," an acorn said,
 As it slowly sank in its mossy bed;
 I am improving every day,
 Hidden deep in the earth away.

Little by little it sipped the dew,
 Little by little each day it grew;
 Downward it sent out a thread-like root,
 Up in the air springs a tiny shoot.

Day after day and year after year,
 Little by little the leaves appear;
 And the slender branches spread far and wide,
 Till the mighty oak is the forest's pride.

—Harper's Second Reader.

WHEN THE GREEN GITS BACK ON THE TREES.

In the spring when the green gits back on the trees,
 And the sun comes out and stays,
 And your boots pull on with a right good squeeze
 And you think of your barefoot days;
 When you ort to work and you want to not,
 And you and your wife agrees
 It's time to spade up your garden lot—
 When the green gits back on the trees,
 Well, work is the least of my ideas,
 When the green, you know, gits back on the trees.

When the green gits back in the trees and bees
 Is a buzzin' aroun' agin,
 In that kind of a "lazy go-as-you-please"
 Old gait that they hum roun' in;
 When the groun's all bald where the hay rick stood
 And the crick's riz and the breeze
 Coaxing the bloom in the old dogwood;
 And the green gits back in the trees—
 I like, as I say, in such scenes as these,
 The time when the green gits back on the trees.

When the whole tail feathers o' winter time
 Is pulled out and gone.
 And the sap it thaws and begins to climb,
 And the sweat it starts out on
 A feller's forrerd, a-gitten down

At the old spring on his knees—
 I kind o' like jes' a loaferin' aroun'
 When the green gits back in the trees—
 Jes' a-potterin' roun' as I-durn-please,
 When the green, you know, gits back on the trees.
 —James Whitcomb Riley.

WHAT WE PLANT.

What do we plant when we plant the tree?
 We plant the ship which will cross the sea,
 We plant the mast to carry the sails;
 We plant the planks to withstand the gales—
 The keel, keelson, and beam and knee—
 We plant the ship when we plant the tree.

What do we plant when we plant the tree?
 We plant the houses for you and me,
 We plant the rafters, the shingles, the floors,
 We plant the studding, the lath, the doors,
 The beams and siding, all parts that be;
 We plant the house when we plant the tree.

What do we plant when we plant the tree?
 A thousand things that we daily see;
 We plant the spire that out-towers the crag,
 We plant the staff for our country's flag,
 We plant the shade from the hot sun free;
 We plant all these when we plant the tree.

—Henry Abbey.

WINTER.

WHAT THE WOOD FIRE SAID TO THE LITTLE BOY.

What said the wood in the fire
 To the little boy that night,
 The little boy of the golden hair,
 As he rocked himself in his little arm-chair,
 When the blaze was burning bright?

The wood said: "See,
 What they've done to me!
 I stood in the forest a beautiful tree,
 And waved my branches from east to west,
 And many a sweet bird built its nest
 In my leaves of green
 That loved to lean
 In springtime over the daisies' breast.

From the blossomy dells
 Where the violet dwells
 The cattle came with their clanking bells,
 And rested under my shadows sweet,
 And the winds that went over the clover and wheat,
 Told me all that they knew
 Of the flowers that grew
 In the beautiful meadows that dreamed at my feet.

And the wild wind's caresses
 Oft rumbled my tresses,
 But, sometimes, as soft as a mother's lip presses
 On the brow of the child of her bosom it laid
 Its lips on my leaves, and I was not afraid;
 And I listened and heard
 The small heart of each bird
 As it beat in the nests that their mothers had made.

And in springtime sweet faces
 Of myriad graces
 Came beaming and gleaming from flowery places,
 And under my grateful and joy-giving shade,
 With cheeks like primroses, little ones played,
 And the sunshine in showers
 Through all the bright hours
 Bound their flowery ringlets with silvery braid.

And the lightning
 Came brightening
 From storm skies, and frightening
 The wandering birds that were tossed by the breeze,
 And tilted like ships on black, billowy seas;
 And they flew to my breast,
 And I rocked them to rest
 While the trembling vines clustered and clung to my knees."

"But how soon," said the wood,
 "Fades the memory of good!
 For the forester came with his axe gleaming bright,
 And I fell like a giant all shorn of his might.
 Yet still there must be
 Some sweet mission for me:
 For have I not warmed you and cheered you to-night?"

So said the wood in the fire
 To the little boy that night,
 The little boy of the golden hair,
 As he rocked himself in his little arm-chair,
 When the blaze was burning bright.

—Frank L. Stanton, in Atlanta Constitution.

THE FOREST GREETING.

Good hunting, aye, good hunting,
 Wherever the forests call,
 But ever a heart beats hot with fear,
 And what of the birds that fall?

Good hunting, aye, good hunting,
 Wherever the north winds blow,
 But what of the stag that calls for his mate?
 And that of the wounded doe?

Good hunting, aye, good hunting,
 And, ah, we are bold and strong,
 But our triumph call through the forest hall
 Is a brother's funeral song.

For we are brothers ever,
 Panther and bird and bear;
 Man and the weakest that fear his face,
 Born to the nest or lair.

Yes, brothers, and who shall judge us?
 Hunters and game are we,
 But who gave the right for me to smite?
 Who boasts when he smiteth me?

Good hunting, aye, good hunting,
 And dim is the forest track,
 But the sportsman Death comes striding on;
 Brothers, the way is black.
 —Paul Lawrence Dunbar, in Century.

THE OAK TREE.

Long ago in changeful autumn,
 When the leaves were turning brown,
 From a tall oak's topmost branches
 Fell a little acorn down.

And it tumbled by the pathway,
 And a chance foot trod it deep
 In the ground, where all the winter
 In its shell it lay asleep.

With the white snow lying over,
 And the frost to hold it fast,
 Till there came the mild spring weather,
 When it burst its shell at last.

Many years kind nature nursed it,
 Summers hot and winters long;
 Down the sun looked bright upon it,
 While it grew up tall and strong.

Now it stands up like a giant,
 Casting shadows broad and high,
 With huge trunk and leafy branches,
 Spreading up into the sky.

Child, when haply you are resting
 'Neath the great oak's monster shade,
 Think how little was the acorn
 Whence that mighty tree was made.

Think how simple things and lowly
 Have a part in nature's plan;
 How the great have small beginnings,
 And the child becomes a man.

Little efforts work great actions,
 Lessons in our childhood taught,
 Mold the spirits to the temper,
 Whereby noblest deeds are wrought.

Cherish then the gifts of childhood,
 Use them gently, guard them well;
 For their future growth and greatness
 Who can measure, who can tell?
 —Anon.

THE SCHOOL-HOUSE YARD.

(For eight children. All repeat the last verse.)

The school-house yard was so big and bare,
 No pleasant shadow nor leafy trees;
 There was room enough, and some to spare,
 To plant as many as ever you please.

So first we set a little pine
 For the wind to play its tunes upon.
 And a paper birch, so white and fine,
 For us children to write our secrets on.

Then two little elms to build an arch
 Right over the gate, when they grow up tall,
 And a maple for tiny blooms in March,
 And scarlet leaves in the early fall.

A cedar tree for its pleasant smell,
 A mountain ash for its berries bright,
 A beech for its shade and nuts as well,
 And a locust tree for its blossoms white.

Then last we planted an acorn small,
 To grow in time to a sturdy oak;
 And somehow it seemed to us children all
 That this was the funniest little joke.

For sweet Miss Mary smiling said,
 "The other trees are your very own,
 But this little oak we will plant instead
 For your grandchildren, and them alone."

Oh, how we laughed, just to think that when
 Our acorn grows to an oak tree fair,
 That we shall be grandpas and grandmas then,
 With wrinkled faces and silver hair.

I wonder now if the little folk
 That come in the days that are to be,
 To frolic under the future oak,
 Will be as merry and glad as we?

And if they will plant their elm and beech
 As we do in the selfsame way,
 And sing their chorus and speak their speech,
 And have such fun upon Arbor Day?
 —Elizabeth Howland Thomas, in *Youth's Companion*.

SONG OF THE TREE.

Warm in the deep of the prison of sleep,
 I lay in the tomb of the Earth,
 Till the spirit of God in the tingling sod
 Aroused my spirit to birth.
 Then fed by the dew and the sun I grew
 From sapling-hood to a tree,
 As tall and elate, as strong and as straight,
 As ever a Tree should be.

Now, robed in a sheen of shimmering green,
 Bathed in the sunrise red,
 My branches glisten, my little leaves listen
 For secrets that never were said;
 Though the sunshine glint, and the west wind hint,
 And the raindrops murmur, I ween
 Man never shall learn, nor a Tree discern,
 The ultimate thing they mean.

Or stripped to the chill of the north wind's will,
 I stand in my strong bare bones;
 I dance with the blast, as maddening past,
 The tempest in anguish moans.
 With strife and song my spirit grows strong,—
 In the law of my being I grow,
 Till the lightning smite, or the wind in its might,
 The growth of the years o'erthrow.

And when long I have lain in the sun and the rain,
 And the creeping things grow bolder,
 And Earth, my mother, makes Dust my brother,
 As into the ground I moulder,
 Then out of my death shall arise the breath
 Of flowers of rainbow hues,—
 So, welcome my life, with its growth and its strife,
 Then—Death be the Life I choose.

—Edna Kingsley Wallace.

WOODMAN, SPARE THAT TREE.

Woodman, spare that tree,
 Touch not a single bough!
 In youth it sheltered me,
 And I'll protect it now:
 'Twas my forefather's hand
 That placed it near his cot;
 There, woodman, let it stand,
 Thy axe shall harm it not.

That old familiar tree,
 Whose glory and renown
 Are spread o'er land and sea—
 And would'st thou hack it down?
 Woodman, forbear thy stroke
 Cut not its earth-bound ties.
 Oh, spare that aged oak,
 Now towering to the skies!

When but an idle boy,
 I sought its grateful shade;
 In all their gushing joy,
 Here, too, my sisters played.
 My mother kissed me here;
 My father pressed my hand—
 Forgive the foolish tear;
 But let the old oak stand.

My heart-strings round thee cling,
 Close as thy bark, old friend;
 Here shall the wild birds sing,
 And still thy branches bend.
 Old tree! the storm still brave,
 And, woodman, leave the spot!
 While I've a hand to save,
 Thy axe shall harm it not.

FOREST SONG.

(Air: "Red, White and Blue.")

A song for the beautiful trees!
 A song for the forest grand,
 The garden of God's own land,
 The pride of his centuries.
 Hurrah! for the kingly oak,
 For the maple, the sylvan queen,
 For the lords of the emerald cloak,
 For the ladies in living green.

A song for the forest aisled,
 With its gothic roof sublime,
 The solemn temple of time,
 Where man becometh a child,
 As he lists to the anthem-roll
 Of the wind in the solitude,
 The hymn which telleth his soul
 That God is the voice of the wood.

So long as the rivers flow,
 So long as the mountains rise,
 May the forest sing to the skies,
 And shelter the earth below.
 Hurrah! for the beautiful trees,
 Hurrah! for the forest grand,
 The pride of his centuries,
 The garden of God's own hand.
 —W. H. Venable.

THE ACORN.

I find you nestling in the balmy grass,
 Here where the knotty oak so stoutly stands,
 While tremulous breezes with rich fragrance pass,
 Like ghosts with viewless flowers in viewless hands!

Frail germ of strength, I scan with eager heed,
 As from the summer sward I lift you up,
 The tawny oval of your polished bead
 Bulging so smoothly from its rugged cup.

And now with heart where happy fancies meet,
 I stoop, and in the yielding meadow make
 A grave wherefrom, with resurrection sweet,
 Some future sun shall win you to awake!

And while I plant you thus, I seem to plant
 Flutings of silver winds in ample boughs
 That weave a gloom where sunbeams richly slant,
 Bees murmur, and the lazy cattle browse.

And now I seem to plant, below the green
 Of these fair ungrown boughs, at eve or morn,
 The first delicious thrilling kiss between
 Two fond young lovers that are yet unborn!
 —Edgar Fawcett.

PLANT TREES.

(Lines written for an Agricultural Exhibition in 1858.)

This day, two hundred years ago,
 The wild grape by the river's side,
 And tasteless groundnut trailing low,
 The table of the woods supplied.

Unknown the apple's red and gold,
 The blushing tint of peach and pear;
 The mirror of the Powow told
 No tale of orchards ripe and rare.

Wild as the fruits he scorned to till,
 These vales the idle Indian trod;
 Nor knew the glad, creative skill,—
 The joy of him who toils with God.

O Painter of the fruits and flowers!
 We thank Thee for Thy wise design
 Whereby these humble hands of ours
 In Nature's garden work with Thine.

And thanks that from our daily need
 The joy of simple faith is born;
 That he who smites the summer weed
 May trust Thee for the autumn corn.

Give fools their gold and knaves their power;
Let fortune's bubbles rise and fall;
Who sows a field, or trains a flower,
Or plants a tree is more than all!

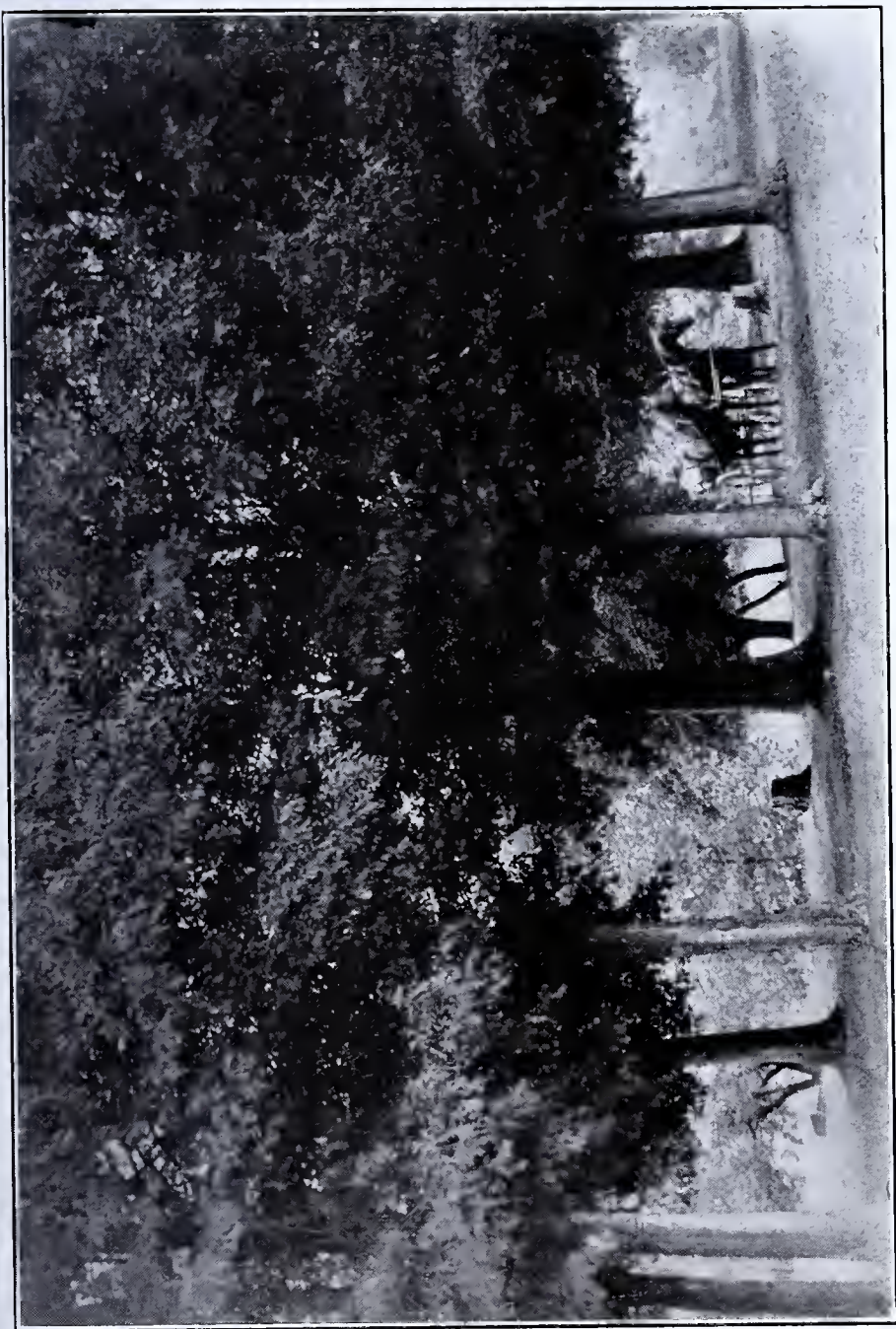
For he who blesses most is blest,
And God and man shall own his worth
Who toils to leave as his bequest
An added beauty to the earth.

And soon or late to all that sow,
A time of harvest shall be given;
The flowers shall bloom, the fruit shall grow,
If not on earth, at last in heaven.

—John G. Whittier.



A view of F. M. Taylor's residence on his farm near Henryville, Indiana, showing the results of tree planting for home and lawn adornment by himself. He enjoys the shade and comforts of his own efforts.



View of a White Oak grove, under the shelter of which a tired workingman makes his couch and sleeps during the hot summer nights.



A Buttonwood, or Sycamore, tree growing natural in the open field, showing the symmetry of nature's way of doing things.



Young Black Oak, growing natural in open field.



A Sugar Maple growing natural in open field.

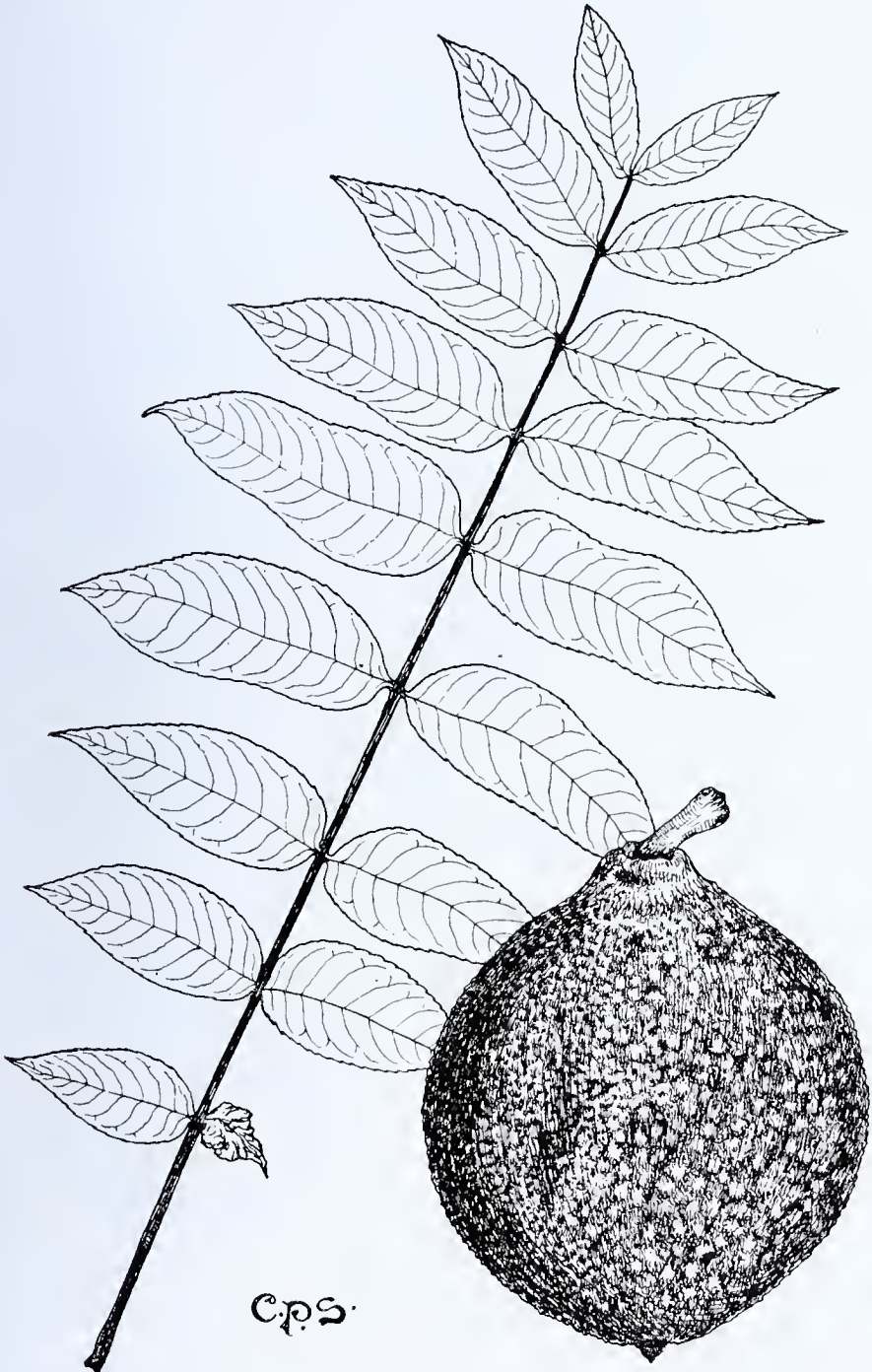


A view showing the drive up Grand View Knob to the headquarters residence buildings at the Forest Reservation, Henryville, Indiana. This drive presents one of the finest views in the State. From the base to the summit is almost 500 feet above the surrounding land level, and more than 1,000 feet above the sea level.

LEAVES AND FRUIT FORMS OF TREES NATIVE IN INDIANA.

Drawing by C. Piper Smith from natural objects.

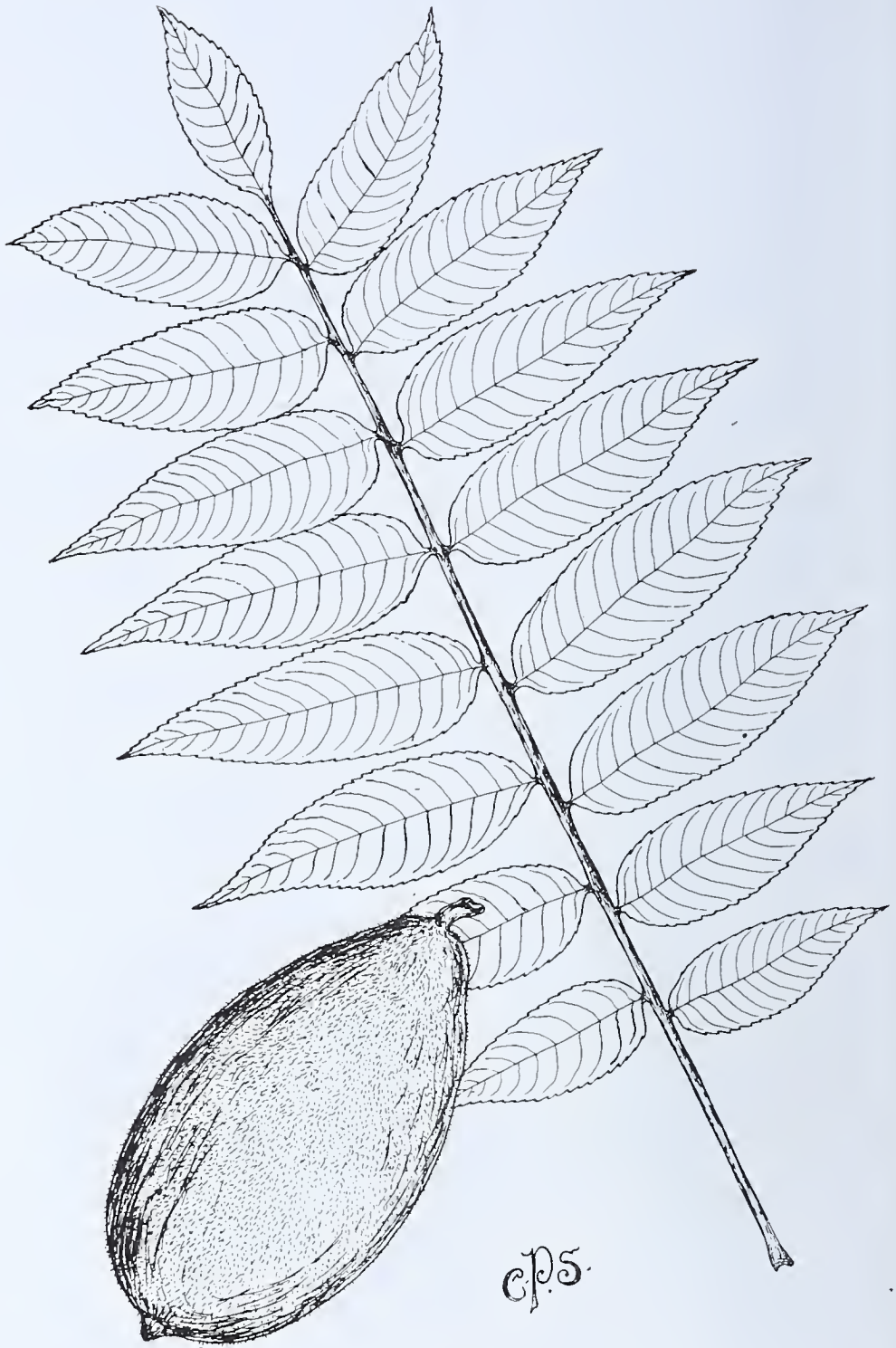
PLATE 1.



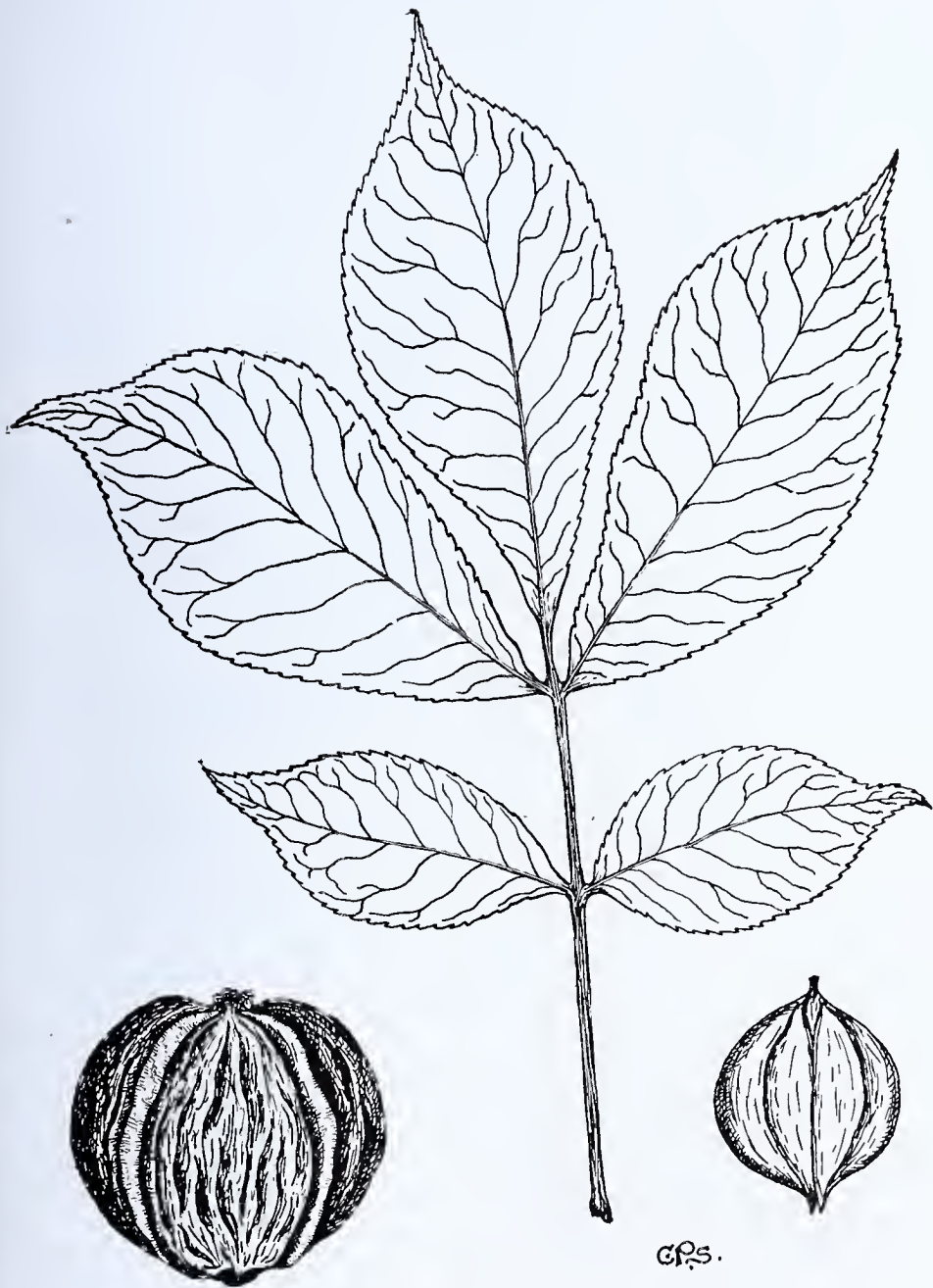
C.P.S.

BLACK WALNUT

(*Juglans nigra*).



BUTTERNUT
(*Juglans cinerea*).



SHELLEARK HICKORY
(*Hicoria ovata*).

Leaf four-ninths natural size; fruit and nut full size.

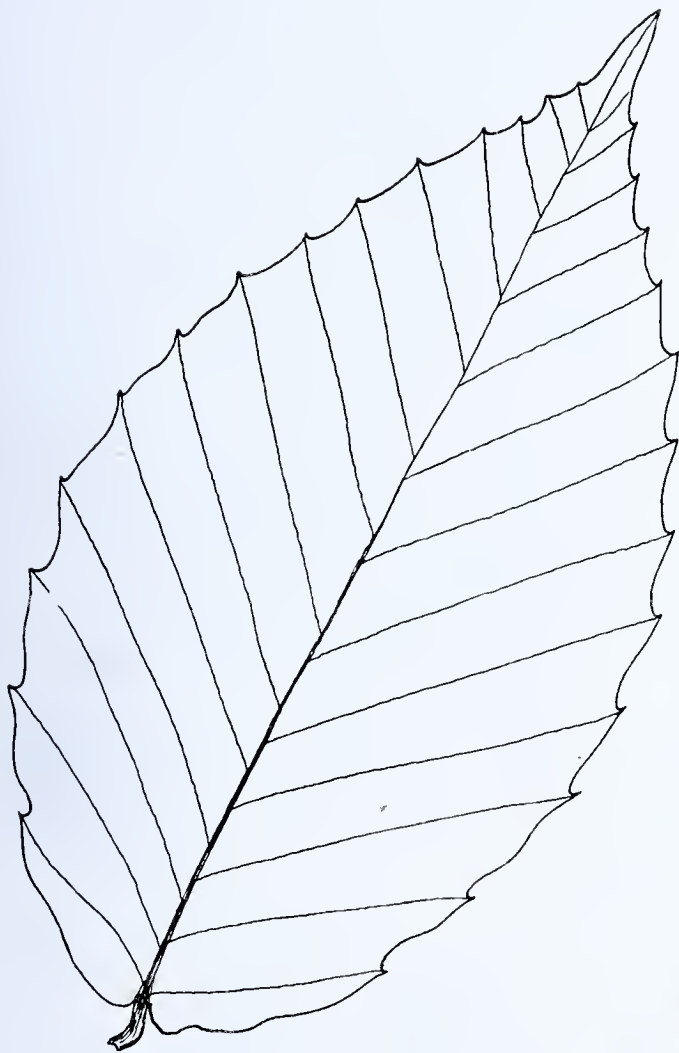


C.P.S.



PIGNUT HICKORY
(*Hicoria glabra*).

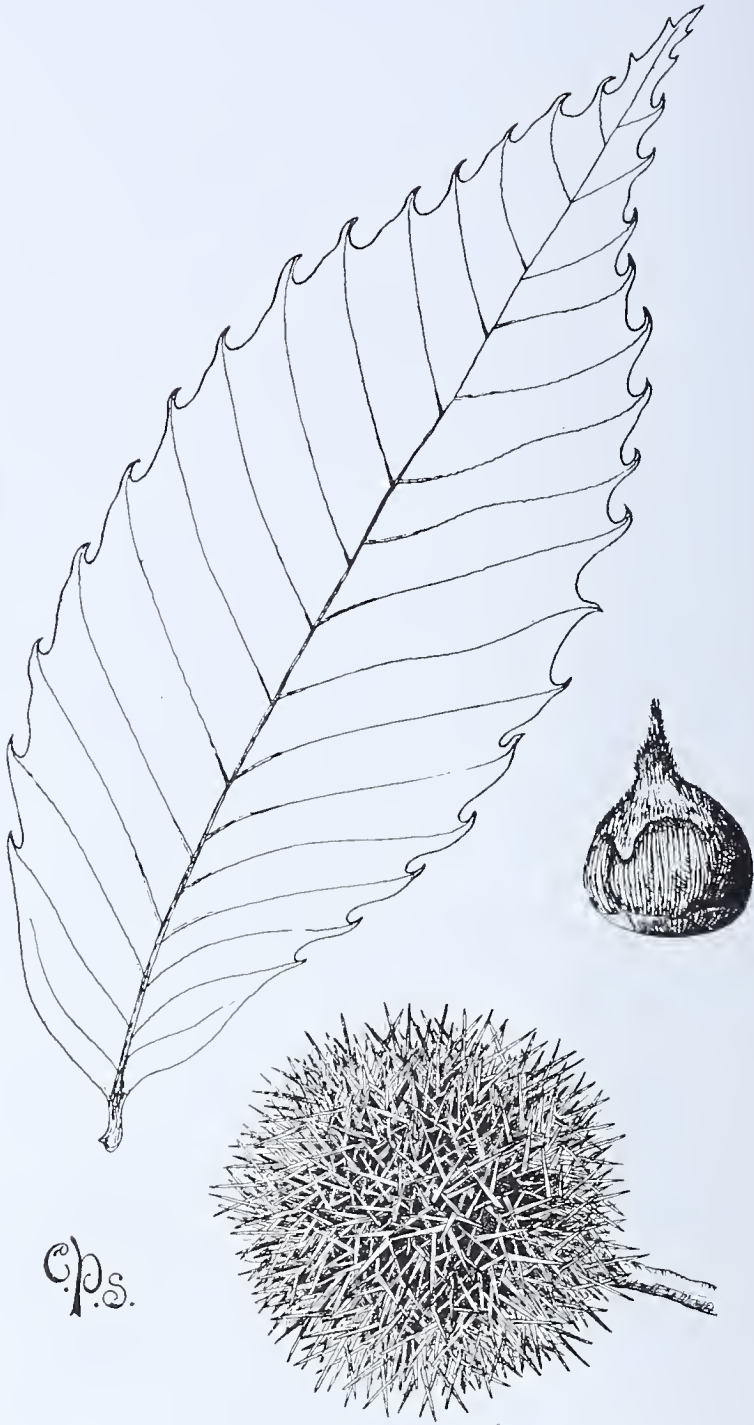
Leaf about one-half natural size,



G.R.S.



BEECH
(*Fagus Americana*).



CHESTNUT
(*Castanea dentata*).

Leaf three-quarters natural size.



RED OAK
(*Quercus rubra*).



PIN OAK
(*Quercus palustris*).



SCARLET OAK
(*Quercus coccinea*).

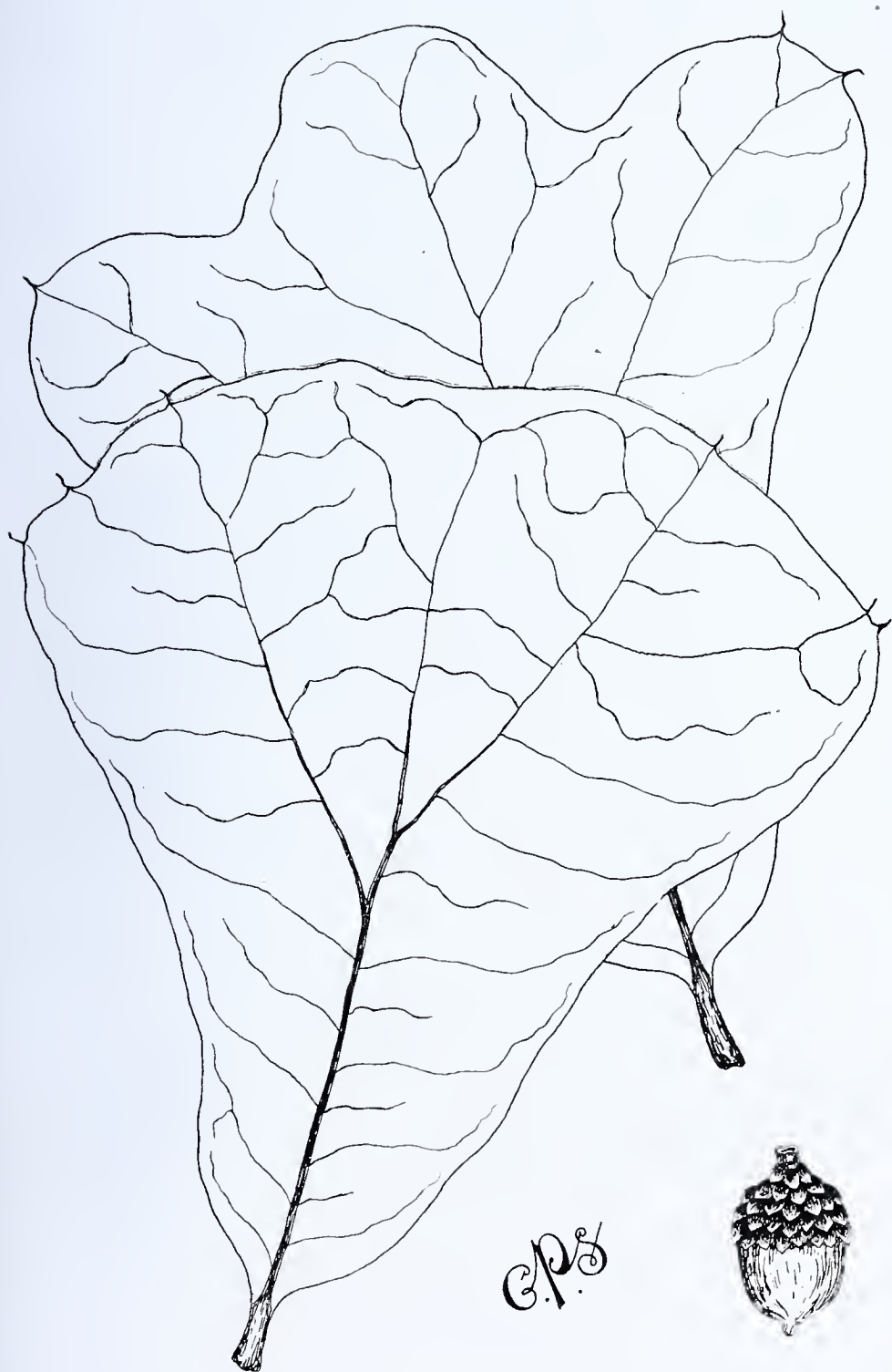
Leaves reduced to three-fourths natural size.



C.P.S.

BLACK OAK
(*Quercus velutina*).

Leaves reduced to one-half natural size.



BARREN OAK
(*Quercus Marylandica*).

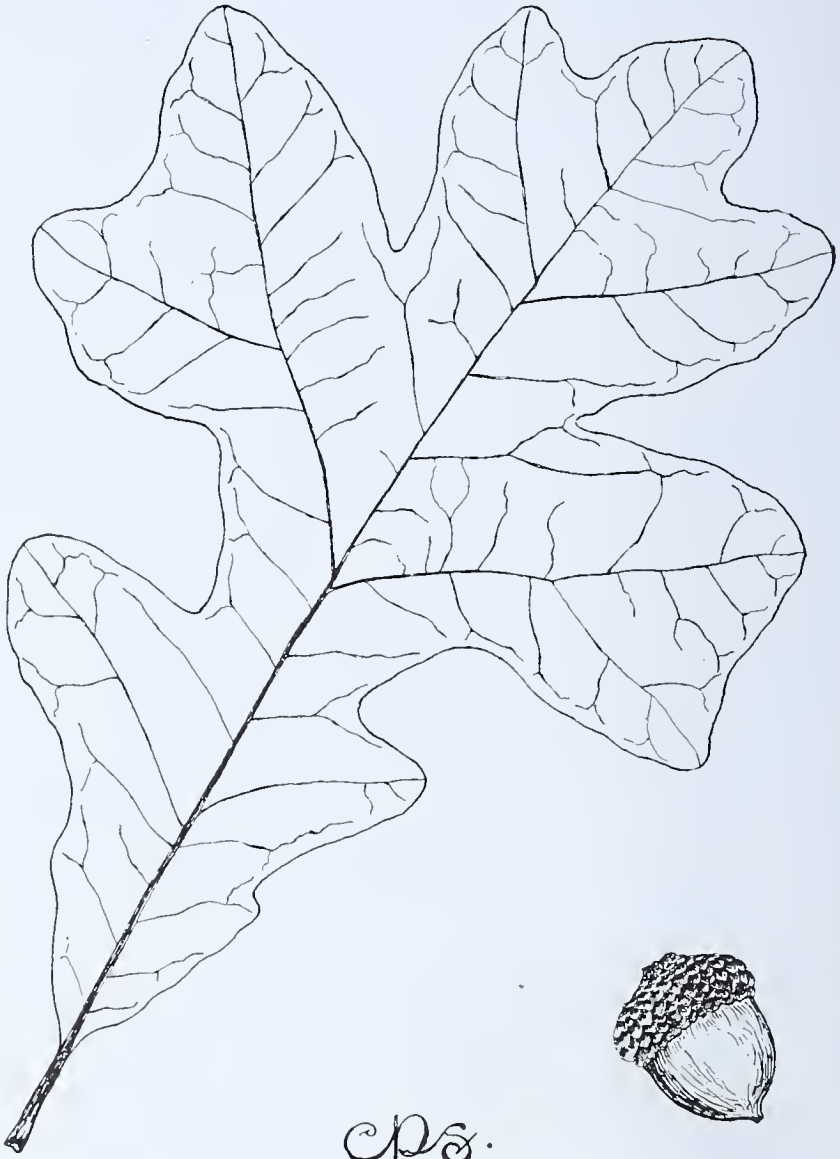


SHINGLE OAK
(*Quercus imbricaria*).



C.P.S.

WHITE OAK
(*Quercus alba*).



c.p.s.

POST OAK
(*Quercus minor*).

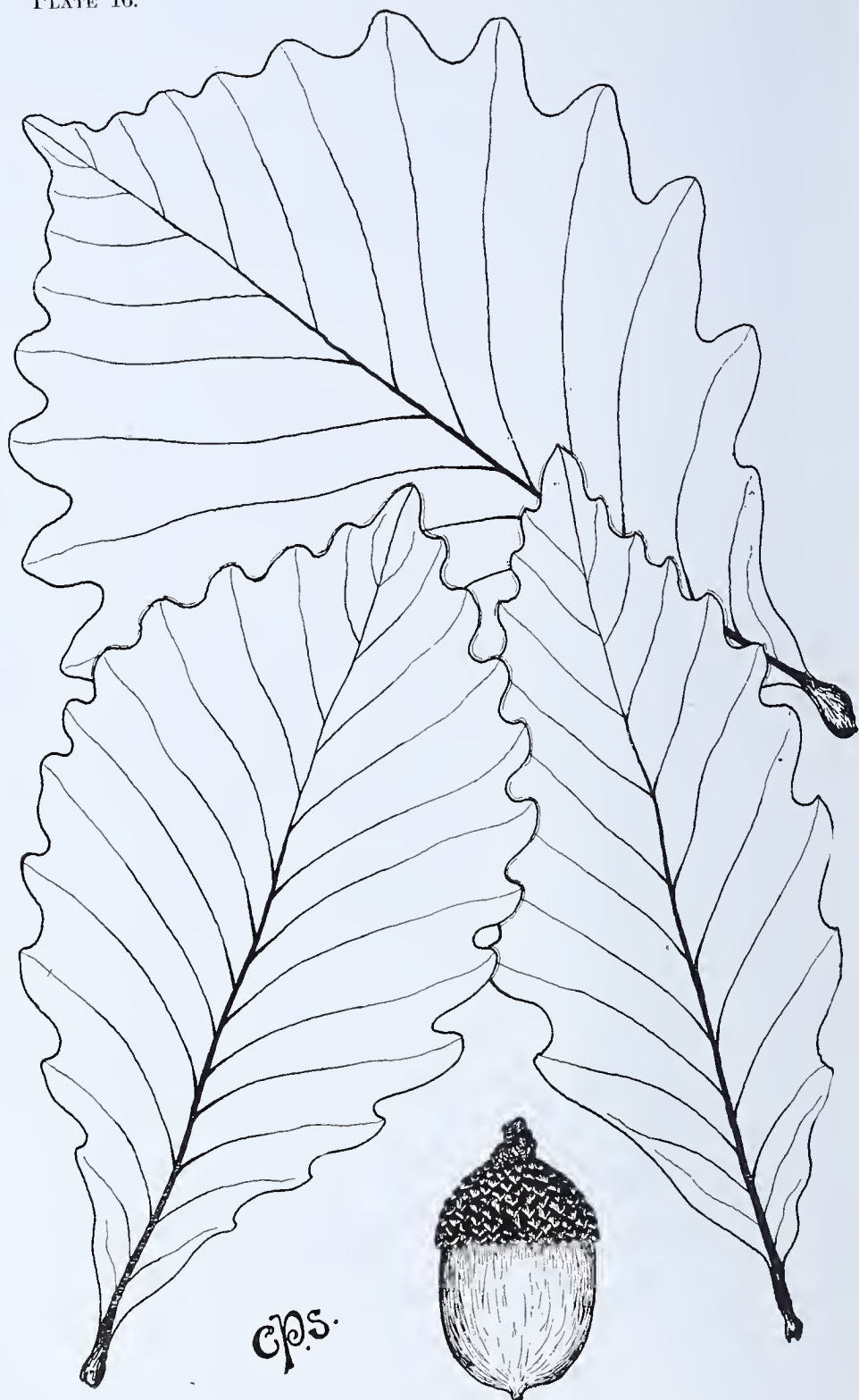


SWAMP WHITE OAK

(Quercus platanoides).

Leaf reduced to three-fourths natural size.

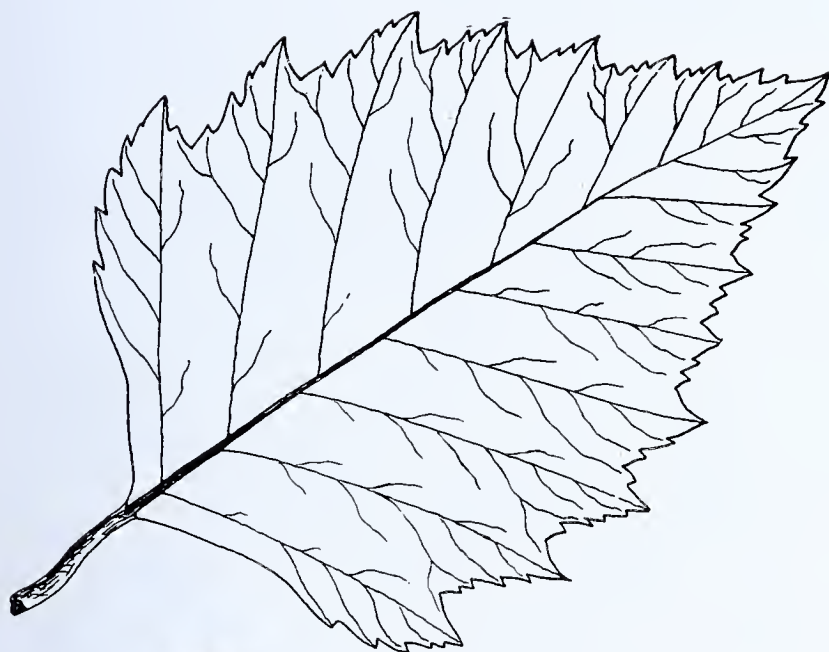
8—Arbor Day.



ROCK CHESTNUT OAK

(Quercus Prinus).

Leaves reduced to two-thirds natural size.



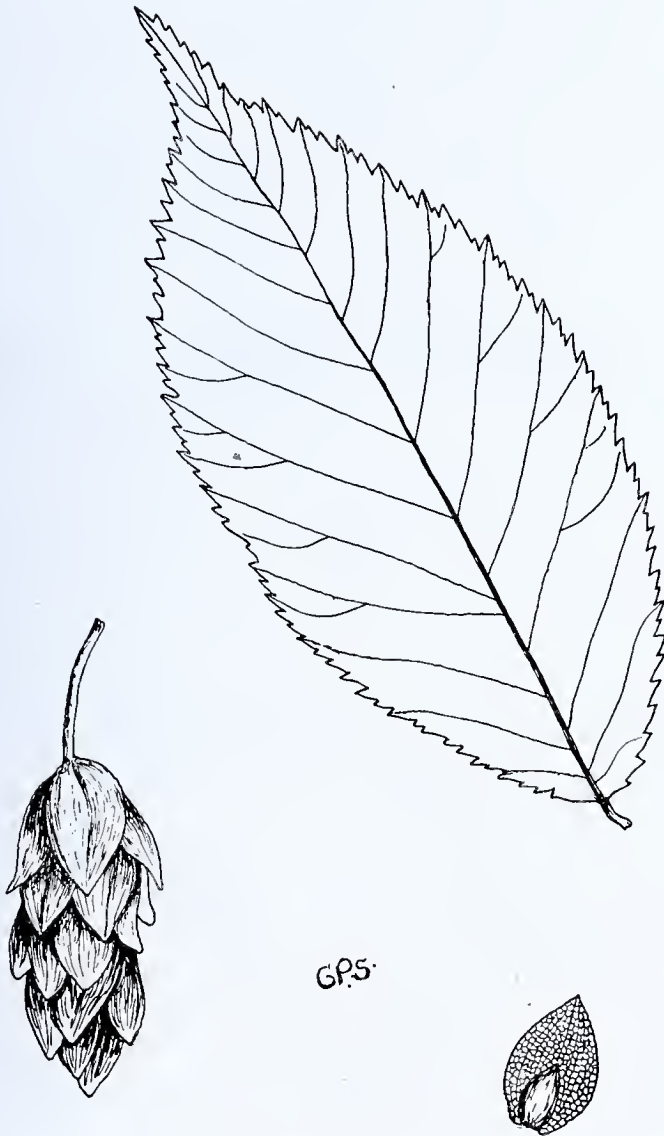
ps.

RED BIRCH
(*Betula nigra*).

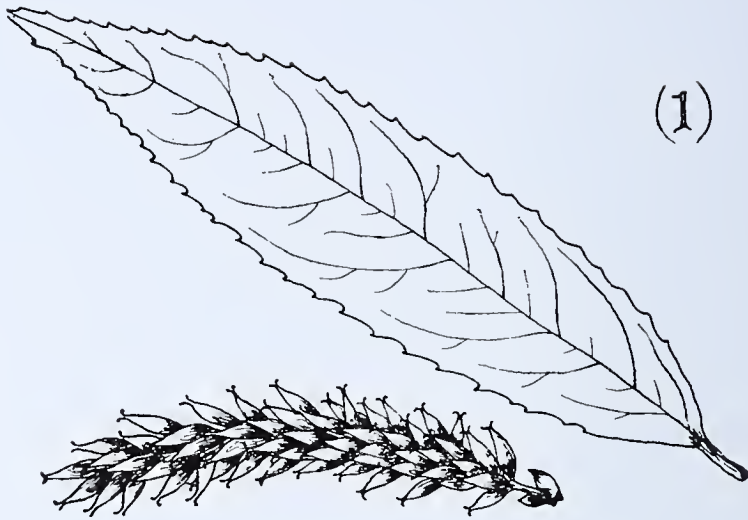


C. P. S.

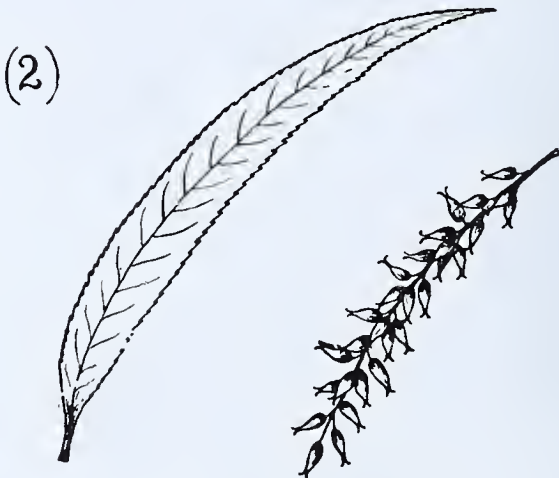
HORNBEAM
(*Carpinus Caroliniana*).



HOP HORNBEAM
(*Ostrya Virginiana*).



(1)

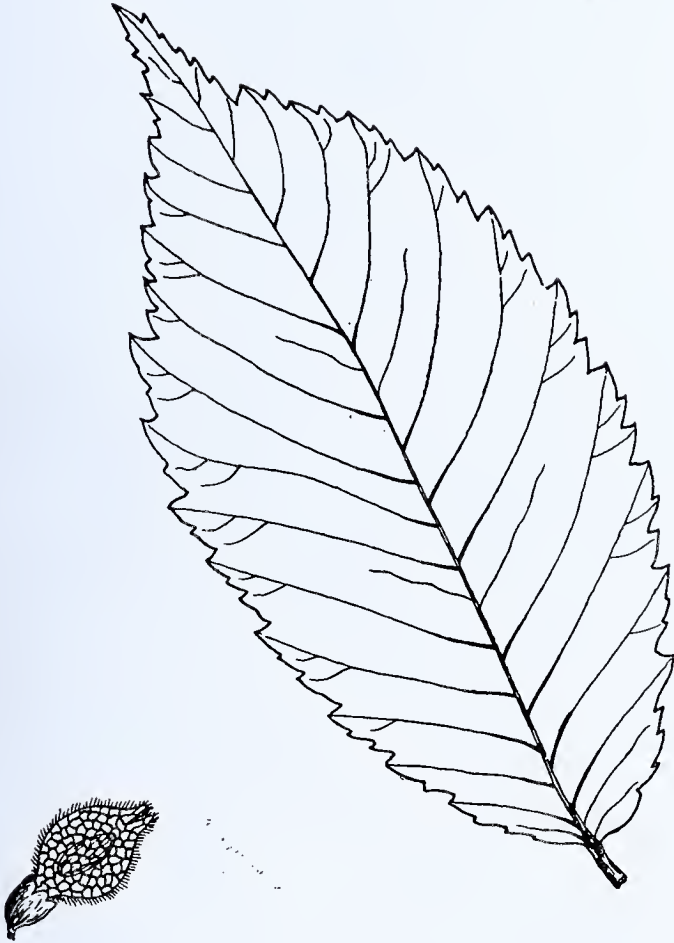


(2)

C.P.S.

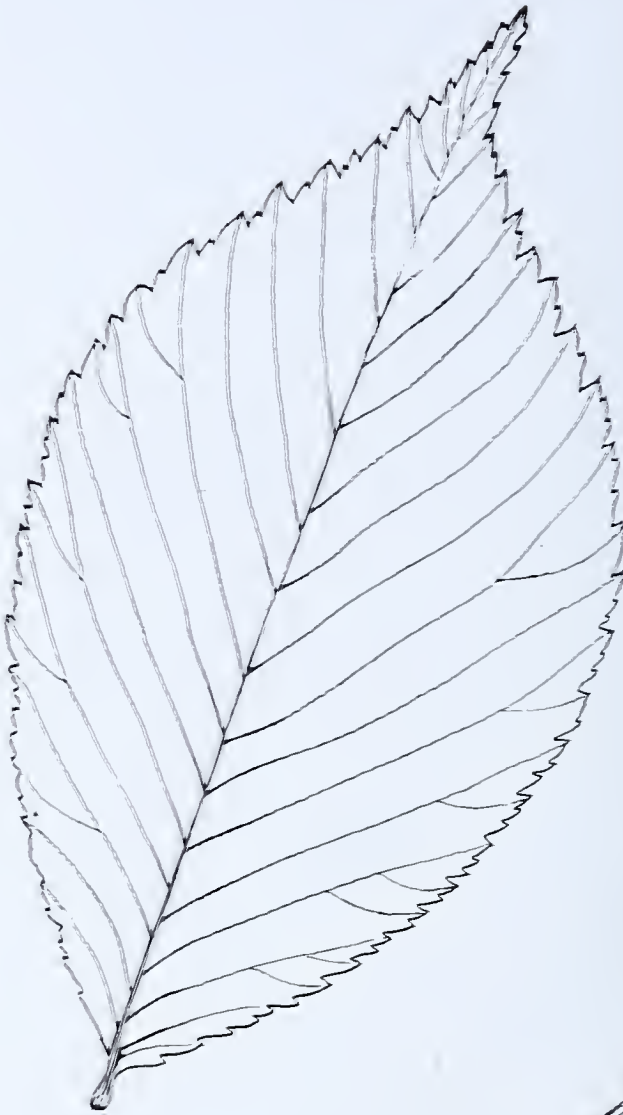
(1) PUSSY WILLOW
(*Salix discolor*).

(2) BLACK WILLOW
(*Salix nigra*).



c.p.s.

WHITE ELM
(*Ulmus Americana*).

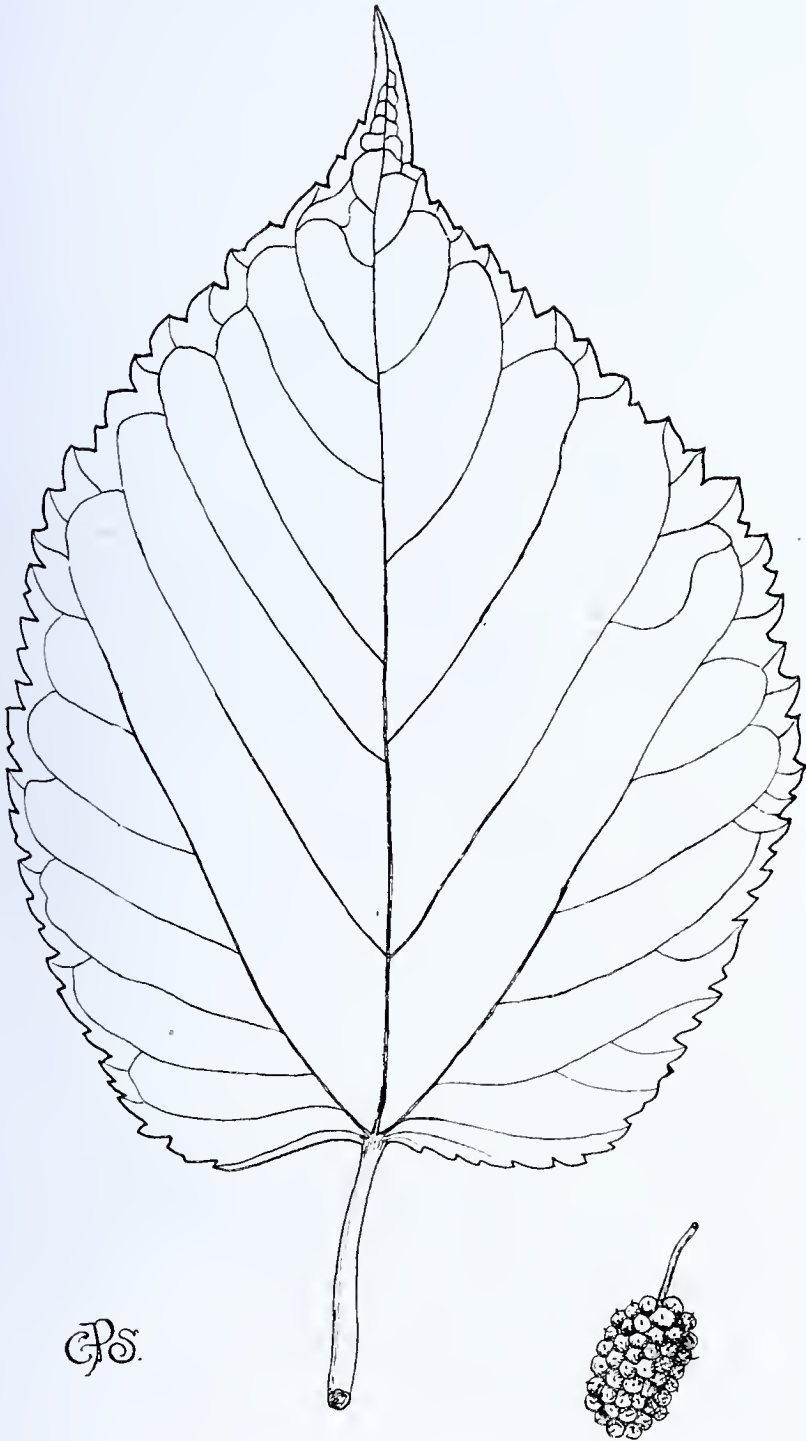


G.P.S.



SLIPPERY ELM

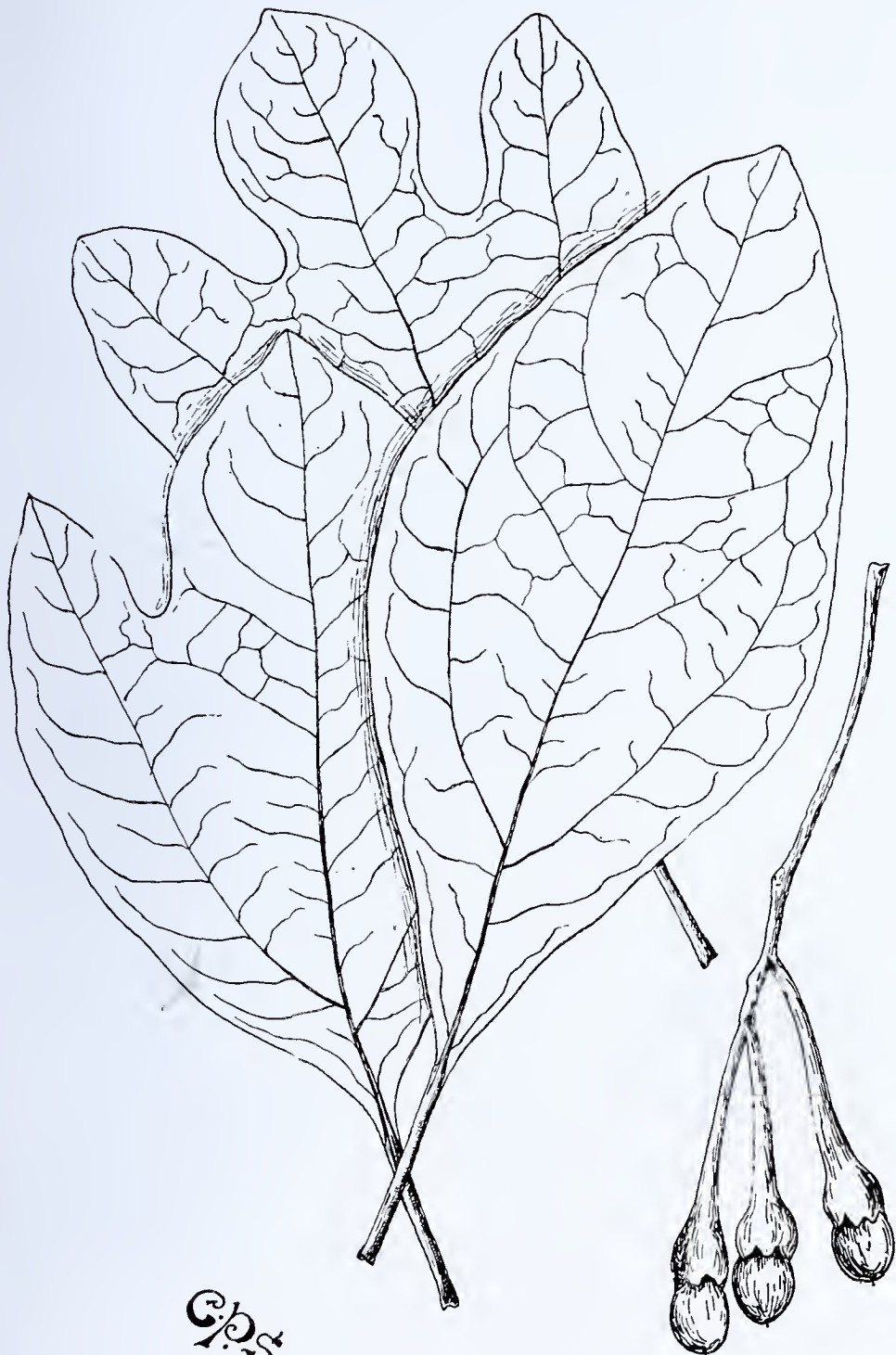
(Ulmus fulva).



RED MULBERRY
(*Morus rubra*).

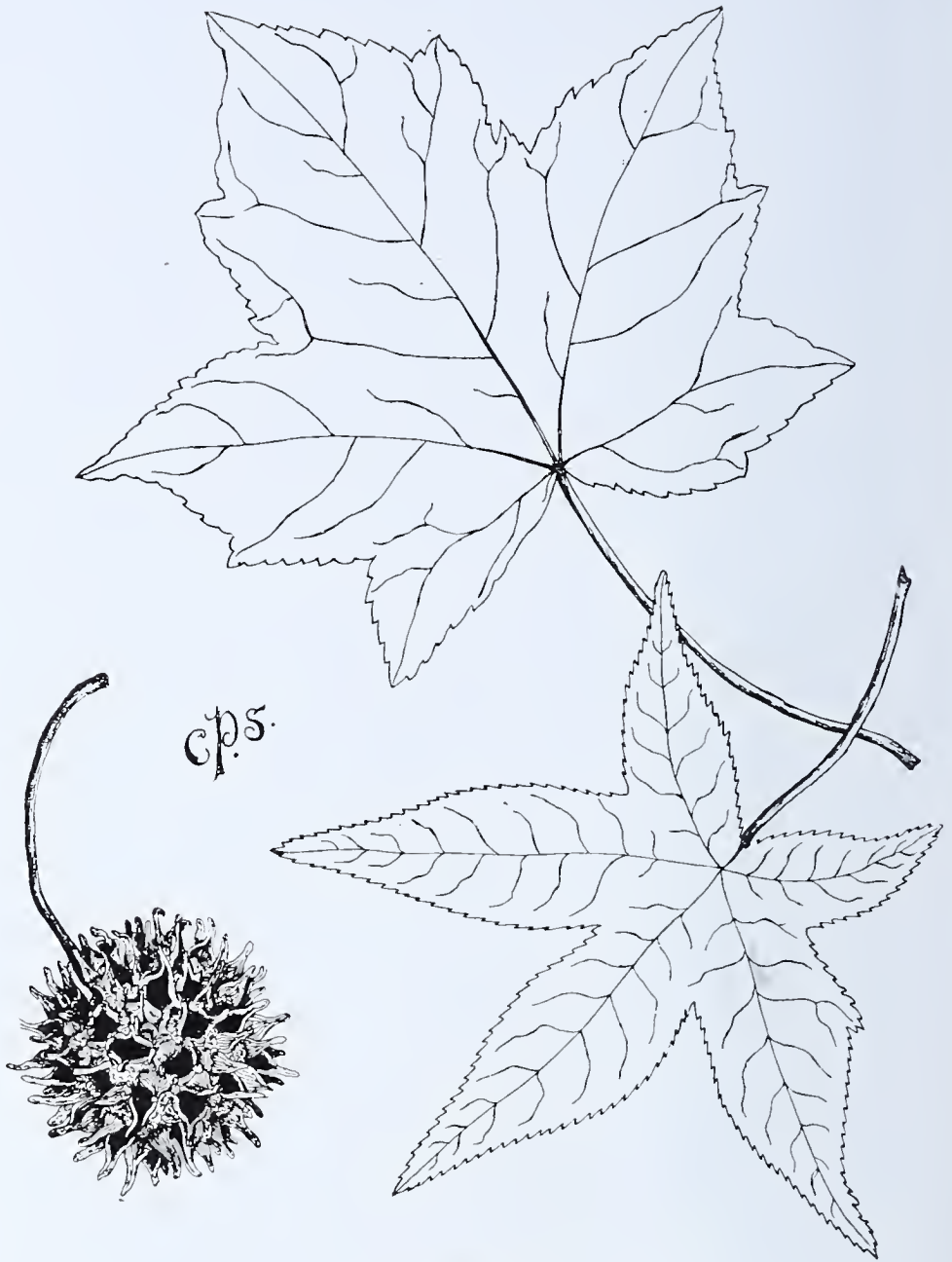


TULIP OR YELLOW POPLAR
(*Liriodendron tulipifera*).



C.P.S.

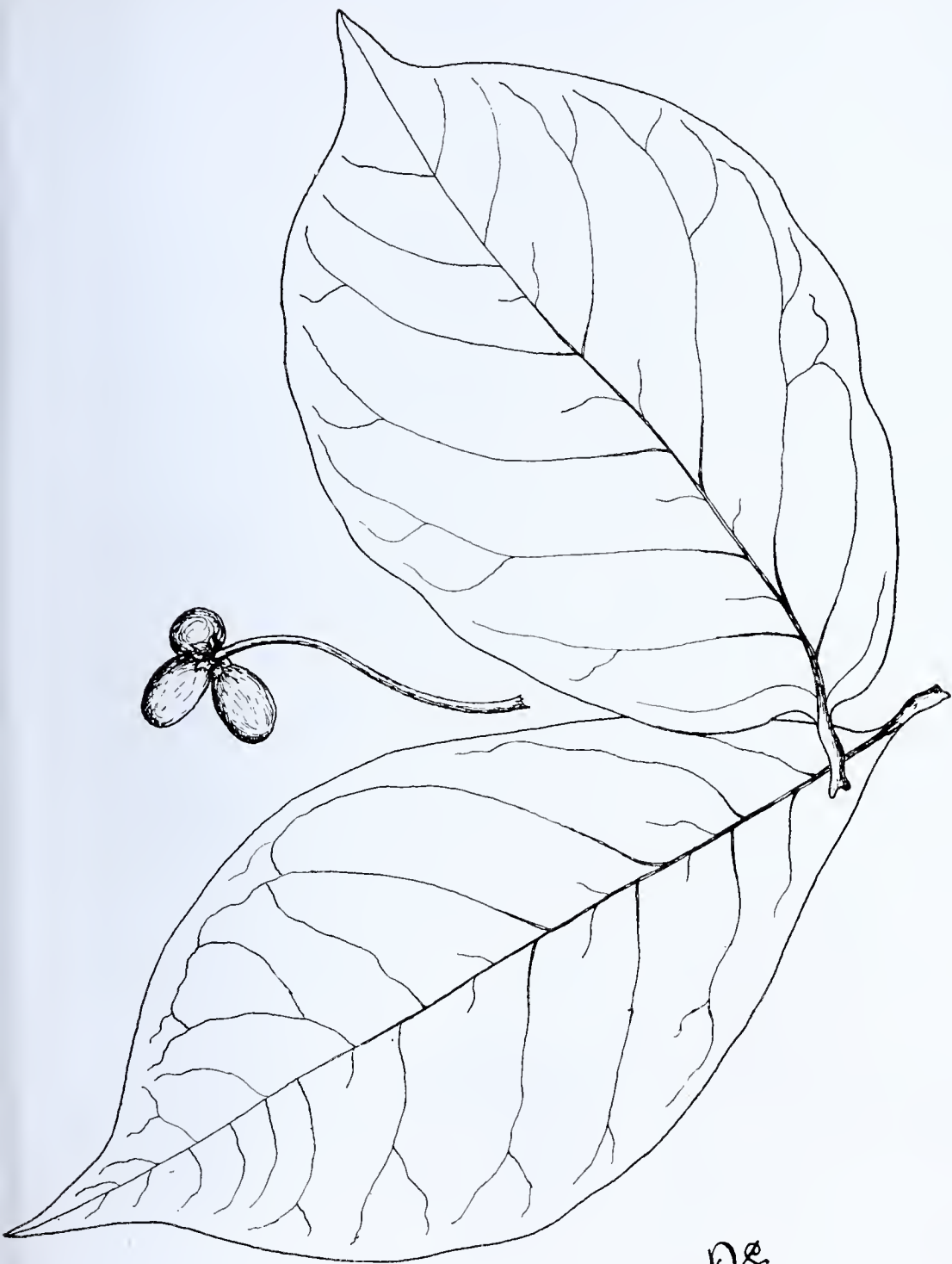
SASSAFRAS
(*Sassafras Sassafras*),



SWEET GUM

(Liquidambar styraciflua).

Leaves three-fourths natural size.



C.P.S.

TUPELO OR BLACK GUM
(*Nyssa sylvatica*).



SYCAMORE
(*Platanus occidentalis*).



RED MAPLE
(*Acer rubrum*).

Leaf three-fourths natural size.



SUGAR MAPLE
(*Acer Saccharum*).

Leaf three-fourths natural size.



C.P.S.

LIN

(Tilia Americana).



eps.

WHITE ASH

(Fraxinus Americana).

Fruit full size; leaf three-eighths natural size.

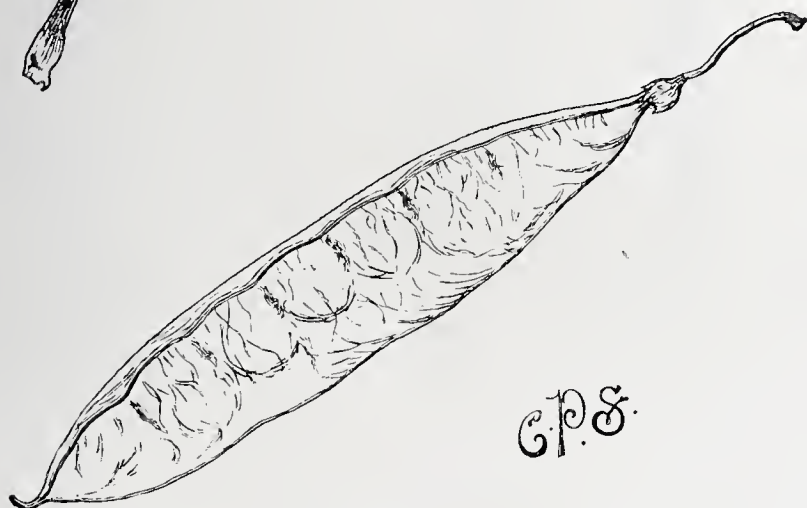
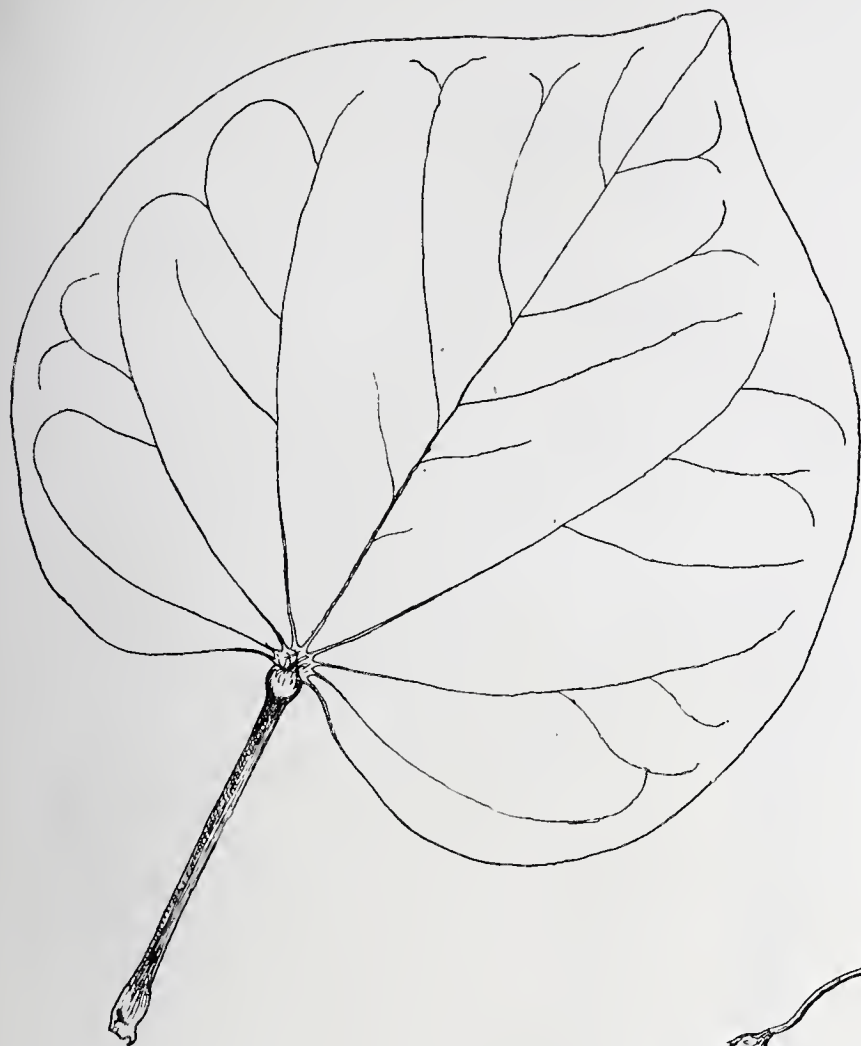


HONEY LOCUST
(*Gleditsia triacanthos*).



G.P.S.

FLOWERING DOGWOOD
(*Cornus florida*).



C.P.S.

REDBUD
(*Cercis Canadensis*).



LARGE TOOTHED ASPEN
(*Populus grandidentata*).



WILD BLACK CHERRY.
(*Prunus serotina*).



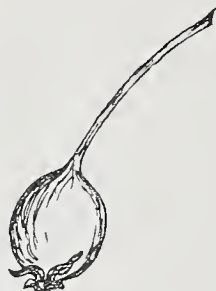
P.S.

WILD RED PLUM
(*Prunus Americana*).



P.S.

RED FRUITED THORN
(*Crataegus mollis*).



eps

GLANDULAR THORN
(*Crataegus rotundifolia*).

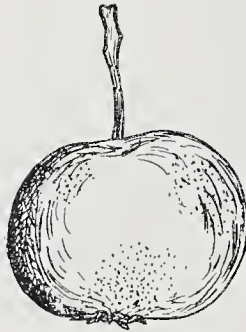


CPS.

COCKSPUR THORN
(*Crataegus Crus-Galli*).



D.S.

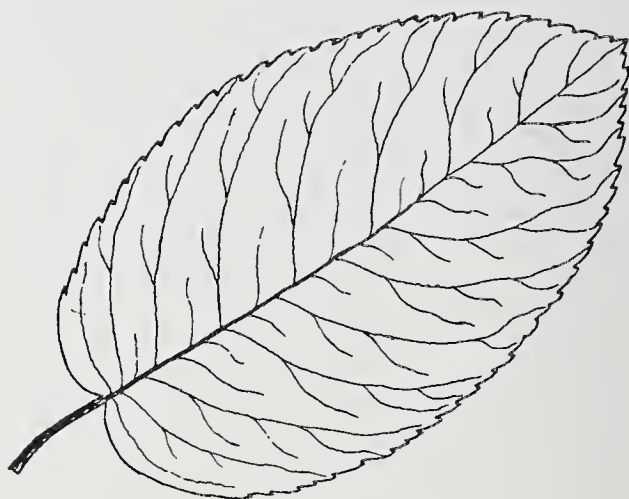


WILD CRAB APPLE
(*Malus coronaria*).



G.S.

PERSIMMON
(*Diospyros Virginiana*).



G.S.

SERVICE BERRY
(*Amelanchier Canadensis*).

BIRDS.

TO THE TEACHERS OF INDIANA.

Through the kindness of Miss Florence Howe, Secretary of the State Audubon Society, I have been able to secure the following excellent articles on the subject of birds. These articles were written by various members of the society. When these good people were asked to do this there was not a dissenting voice. Each expressed himself as being grateful for the privilege of writing a message to the children of the Indiana schools.

These papers should be studied carefully by the teacher. The papers which especially fit a given neighborhood should be selected and assigned to capable pupils. The pupils so selected should study the matter assigned carefully in order to be able to present it as if it were his very own. Excellent results are sure to follow this sort of study.

Trusting that each neighborhood in the State will have many new and delightful experiences with the birds this year,

I am sincerely,

F. A. COTTON.

BIRD LAW.

AN ACT FOR THE PROTECTION OF BIRDS, THEIR NESTS AND EGGS.

[Acts 1891, p. 113. Approved and in force March 5, 1891.]

Section 1. Be it enacted by the General Assembly of the State of Indiana, That it shall be unlawful for any person to kill any wild bird other than a game bird, or purchase, offer for sale, any such wild bird after it has been killed, or to destroy the nests of any wild bird.

Sec. 2. For the purpose of this act, the following only shall be considered game birds: The Anatidæ, commonly called swans, geese, brant, and river and sea ducks; the Rallidæ, commonly known as rails, coots, mudhens, and gallinules; the Linnocotæ, commonly known as shore birds, plovers, surf birds, snipe, woodcock and sand-pipers, tattlers and curlews; the Gallinæ, commonly known as wild turkeys, grouse, prairie chickens, quail and pheasants, all of which are not intended to be affected by this act.

Sec. 3. Any person violating the provisions of Section 1 of this act shall, upon conviction, be fined in a sum not less than ten nor more than fifty dollars, to which may be added imprisonment for not less than five nor more than thirty days.

Sec. 4. Sections one and two of this act shall not apply to any persons holding a permit giving the right to take birds or their nests and eggs for scientific purposes, as provided in section five of this act.

Sec. 5. Permits may be granted by the executive board of the Indiana Academy of Science to any properly accredited person, permitting the holder thereof to collect birds, their nests or eggs for strictly scientific purposes. In order to obtain such permit the applicant for the same must present to said board written testimonials from two well-known scientific men certifying to the good character and fitness of said applicant to be entrusted with such privilege, and pay to said board one dollar to defray the necessary expenses attending the granting of such permit, and must file with such board a properly executed bond in the sum of

\$2,000, signed by at least two responsible citizens of the State as sureties. The bond shall be forfeited to the State, and the permit become void upon proof that the holder of such permit has killed any bird, or taken the nests or eggs of any bird for any other purpose than that named in this section, and shall further be subject for each offense to the penalties provided in this act.

Sec. 6. The permits authorized by this act shall be in force for two years only from the date of their issue and shall not be transferable.

Sec. 7. The English or European house sparrow (*passer domesticus*), crows, hawks, and other birds of prey are not included among the birds protected by this act.

Sec. 8. All acts or parts of acts heretofore passed in conflict with the provisions of this act are hereby repealed.

Sec. 9. An emergency is declared to exist for the immediate taking effect of this act, therefore the same shall be in force and effect from and after its passage.

THE AUDUBON SOCIETY.

BY RICHARD F. SOUTER, FIRST VICE-PRESIDENT INDIANA
AUDUBON SOCIETY.

From the earliest times and until a comparatively recent period no regard was paid to our forests or our birds. Ax and fire made havoc with the one, and the others found every man's hand against them. The natural result followed, practical exhaustion of our forest wealth and a land becoming birdless and menaced by a flood of insect enemies. A few far-sighted toilers for mankind had foreseen the danger long before and given earnest warning but their words were unheeded. As their predictions were fulfilled alarm took the place of indifference, a general interest was aroused, a flood of information and appeal found expression, and associations of public spirited citizens were formed to aid in saving the country from the results of its cupidity and thoughtlessness. Then and thus the Audubon Society was born. From feeble beginnings has grown a society national in scope and influence. It has called attention to the need for protecting the bird life of Alaska, and aided powerfully in securing adequate legislation. Its wardens patrol the Florida keys and save the loveliest of our birds from complete extinction. In nearly all the States are State organizations, and in city, village and township its local societies keep watch and ward over man's mightiest ally, the birds. The Society will gladly furnish information and literature through its National Secretary, Mr. Wm. Dutcher, of New York City. Miss Florence Howe, of Indianapolis, Secretary of the Indiana Audubon Society, will aid in all work within our State.

The Audubon Society works mainly through three channels: education, legislation and the creation of a right public sentiment. Among the earliest and most efficient friends of the birds we find the teachers of our schools. Their own views are enlightened, and by virtue of the fact that they mould life at its most plastic stage they are able to affect powerfully the natures of their pupils. The result is almost a revolution. It is not too much to say that

a generation ago school children were thoughtlessly cruel to the weaker forms of life. Today most of the children of our best schools are thoughtfully kind. The cause of bird protection owes a debt of gratitude to the teachers of our land which can scarce be estimated, much less expressed.

The Society has studied with great care conditions, local, State and national, that it might create and foster wise legislation. The result of its study is the model bird law, which with slight modification, is now the law in the great majority of our States. Under this law every bird which delights us by its beauty, charms us by its song, or serves us by its labor—and many birds do all three of these—is protected. These laws are themselves educative in that they teach men to recognize their friends and to see how few harmful birds there are. It is interesting to note that every bird that is hurtful to man's property is also an enemy of its own kind. We urge that all shall acquaint themselves with the bird law of their State and invoke that law for the protection of our friends.

A right public sentiment is essential to the continuance of educational effort and to the enforcement of law. There is a constant and gratifying advance in this direction. It was but a short time ago that the wings, plumes and stuffed skins of birds were among the commonest objects of adornment, and some of our most graceful and beautiful birds were on the point of total destruction from this cause. Laws were passed, though it is doubtful if any law could control this. But a sentiment was aroused, an emotion mightier than any statute, and now the hideous practice is gone, we trust forever. Let this instance suffice to illustrate the might of that intangible but all-powerful thing, public sentiment. Not all of us teach, not all of us make laws, but all of us are a part of that ultimate arbiter. In some of these ways then every friend of the bird may be useful.

WHY SAVE THE BIRDS?

BY WILLIAM WATSON WOOLLEN.

Nothing is truer than that vegetable life is essential to animal life. Without vegetables we cannot exist. For a time we can live on meat but without vegetables we can not have meat. This necessity for vegetables to support animal life was recognized in the order of creation, for it is recorded that after the earth had been created, "God said, let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind." This was in advance of the creation of any living creature and that man might have meat for food, for it is further recorded that after God had given dominion to man "over every living thing that moveth upon the earth," He said to him "I have given to you every herb-bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat."

It is also recorded that God said, "cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life; thorns also and thistles shall it bring forth to thee; and thou shalt eat of the herb of the field; in the sweat of thy face shalt thou eat bread till thou return unto the ground." Whether in fact this was said or not, two facts here stated are true, namely, that man "till he returns unto the ground" is dependent upon "the herb of the field" for his bread, and that "in the sweat of thy face shalt thou eat bread." In other words, it is a stubborn fact, that since that record was made, a great warfare has been and is being waged in this world of ours between good and evil, and this is as true, or more so, in the vegetable world as that in the world of morals. "Thorns and thistles" stand for the three vicious things which we must contend with in this warfare if we are to have "the herb of the field" to live upon, namely, (1) the rodents,

(2) the insects and (3) the weeds. The rapidity with which these pests increase, and the damage they are capable of doing, is almost incomprehensible.

Every well-informed person knows what has happened in Australia because of the importation into it of a few rabbits. Their progeny has overrun the country, its vegetation has been threatened with utter destruction and millions of dollars have been spent in an effort to get rid of them, and the warfare against them still goes on. Rats and mice are others of these pests, and with their destructive habits we all are familiar. They breed four and five times in a year and from five to ten young at a time, and these in turn are capable of breeding when they are six months old. One of the most destructive of these is the common field mouse. People who have been reared in the country know how destructive to vegetable life these mice are. They do great damage to our meadows and orchards. About eighteen years ago we planted an apple orchard at Somerleaze, our country home. We took the best care of it and in due time it bore a great crop of fruit. We were proud of our achievement and inspired to do even more than what we had done to make it bear a larger crop of fruit, mulched it well with weed cuttings from our wheat stubble. The next spring to our sorrow, we discovered that the field mice had taken shelter under the mulch and had girdled every one of our trees and since then most of them have died.

The rapidity with which the insect pests increase and the destructive powers with which they are possessed is marvelous. Reaumer, in his history of the insects, estimates that one aphid may be the progenitor of not less than 5,904,900,000 during the few weeks of her existence. Theodore Wood, in his book on "Our Insect Enemies" says, "It may seem a widely and extravagant and unjustifiable statement if we say that but for certain opposing agencies the aphid would overrun the entire world; that it would leave scarcely a green leaf upon the earth and that it would cause such terrible devastation that all terrestrial life would wholly disappear, and the globe become one vast desert incapable of supporting animation, and utterly without living beings of any kind. Still more impossible would it appear were we to state that this ruin and devastation would be the outcome, not many centuries of gradual increase, but of only a few short months. Incredible as

the assertion may seem, however, such results are no more than must logically follow if the aphids should be allowed to remain perfectly unmolested during the period of but a single year." And this is only one of these destructive insect pests with which we must contend.

Indeed, there are pestiferous and destructive insect pests for every condition, place and plant about us. For instance, in the air, by day we have flies, butterflies, wasps, moths and winged ants, and at night moths, mosquitoes, bugs and beetles. Upon our shrubs and small fruits we have slugs, leaf hoppers, flea beetles, rose chafers, climbing cutworms and caterpillars. In our gardens we have cutworms, cabbage worms, root maggots, cucumber, pea and bean weevils and squash bugs. In our orchards we have borers, codlin moths, bark lice, plant lice, cankerworms and leaf caterpillars. In our meadows we have grasshoppers, cut worms, army worms, crane flies, white grubs and root borers. In our corn and wheat fields, we have wire worms, ball worms, root worms, Hessian flies, ants and chinch bugs. In our forests we have plant lice, bark lice, trunk borers and leaf caterpillars. In our marshes, ponds and streams, we have water beetles, water bugs, mosquitoes and May flies. We all know how the Rocky Mountain locust or grasshopper in years gone by overran the vast territory west of the Mississippi river, and now the cotton industry of the United States is threatened with utter ruin by the cotton boll weevil. The State of Massachusetts has spent more than a million of dollars in fighting the gypsy moth and it is not yet exterminated.

One only needs to count the seeds produced by a single plant of purslane, plantain or thistle to be convinced of the prodigious reproductive powers of our common weeds. But for the warfare that is being waged against them by man and his allies, the weeds would take exclusive possession of our gardens and fields and we would be without bread. It may be that in that condition we, like the savages, could subsist upon the mast, wild fruits and the flesh of the wild animals and be able to clothe ourselves with their skins, but it would be impossible for us to live the lives of civilized beings. That bread is the staff of life, is an axiom which has grown out of the experience of the past ages of man's existence.

While it is true that "in the sweat of thy face shalt thou eat bread," it is also true that by "the sweat of thy face" man alone

can not have bread to eat. He is a dependent being and without the allies which nature so bountifully supplies to him, he would be utterly powerless in keeping under control the evil and destructive forces. In this work our birds are the most effective of these allies. Each species of them performs certain services in the economy of nature which cannot be accomplished so well by any other species. The rodents, which as we have seen, are so destructive to our orchards and crops, are kept in subjection by the shrikes, hawks and owls. It was Gilbert White of Selborne, the English clergyman and naturalist of the eighteenth century, who first directed the attention of the public to the fact that the owls destroyed many rodents. Near by his parish house stood a tree with a cavity in which lived a pair of owls. He noticed at the root of this tree a large quantity of pellets which had been regurgitated by the owls and he made a careful examination of them and discovered that the owls had destroyed large numbers of mice and other rodents. Since then his observations have been confirmed by many scientists. In the city of Washington two hundred pellets were taken from beneath the nest of a barn owl and examined and found to contain four hundred and fifty-four skulls, of which two hundred and twenty-five were meadow mice, two pine mice, one hundred and seventy-nine house mice, twenty rats, six jumping mice, twenty shrews, one star-nosed mole and one English sparrow. In the Department of Agriculture at Washington forty-nine stomachs of the red-legged hawk were examined and it was found that forty of them contained mice, and five contained other rodents, such as rabbits, gophers, weasles and shrews. In an examination of eighty-eight stomachs of the loggerhead shrike it was found that mice constituted fifty per cent. of their food.

Mr. Frank M. Chapman in "Bird Life" has well said: "In the air, swallows and swifts are coursing rapidly to and fro, ever in pursuit of the insects which constitute their solid food. When they retire, the night hawks and whippoorwills take up the chase, catching moths and other nocturnal insects which escape the day-flying birds. The fly catchers lie in wait, darting from ambush at passing prey, with suggestive click of the bill returning to their post. The warblers, light, active creatures, flutter about the terminal foliage, and with almost the skill of the humming bird pick insects from leaf or blossom. The vireos patiently explore

the under sides of leaves and odd nooks and corners to see that no skulker escapes. The woodpeckers, nuthatchers and creepers attend the tree trunks and limbs, examining carefully each inch of bark for insect eggs and larvae, or excavating for the ants and borers they hear at work within. On the ground the thrushes, sparrows and other birds feed upon innumerable forms of terrestrial insects." And he might have added that the ducks and geese attend to the forms which are to be found in our marshes, ponds and streams. Professor Weed, the eminent entomologist, says, "After many years of study of the relation of birds to agriculture, I am convinced that the birds are a most potent factor in making crop production possible, and without them, we should be overrun with pests—vertebrate and invertebrate—to an extent which we now have no conception." Michelet, the French naturalist and historian, in his "Insect Life," said, "If all the birds of the world were destroyed, it would be uninhabitable for man in nine years." And this is why, from an economic standpoint, I would save the birds.

PECULIARITIES AFFECTING BIRD DISTRIBUTION.

BY AMOS W. BUTLER.

The region about the southern end of Lake Michigan presents an unusually fertile field for the ornithologist. Situated as it is, midway between the wooded region of the east and the treeless plains of the west, with the warm river bottoms of the south, rich in southern species, extending to within a comparatively short distance, and the great lake upon the north, northwestern Indiana forms a kind of "four corners" where the avian faunae of four regions intergrade. To the proximity of Lake Michigan we are indebted for a number of more or less strictly maritime species. As would be expected the southern species occur only in summer, with the exception of *Lophophanes bicolor*, which is found only in winter. Not only is the influence of the lake upon the faunae shown by the occurrence of numerous species of birds, attracted by the presence of a large body of water, with its congenial surroundings, but the influence of the lake upon the climate and the vegetation in its immediate vicinity has a marked influence upon the list of summer residents. The northwestern portion of the State is divided into alternating tracts of prairie, marsh and woodland, each possessing a bird life of its own. In Lake County, along the lake shore, is a stretch of pine woods known as the "pinery," which is quite peculiar. (Condensed from E. W. Nelson's notes of "Birds of Northeastern Illinois.") Coming south one crosses the Kankakee River and marshes, well-known regions for water fowl and marsh-inhabiting birds, and enters the Wabash Valley. Back from this valley proper we find occasional prairies and extensive meadows, where such prairie-inhabiting forms as Henslow's sparrows, yellow-winged sparrows, black-throated buntings and prairie larks are expected to be found. The lower Wabash Valley is noted for its extended "bottom lands" and "cypress swamps," which, for their flora, no less than their birds, are of much interest. The amount of bird life here in summer is very much in excess of that in the northwest corner of the State at that season. The difference in the number of birds noted would be

readily observed. In the southeastern part of the State the land rises in some places almost 400 feet above the Ohio River within a mile or very little more. On leaving the fertile river bottoms, with their successive terraces, one ascends the steep river hills and soon reaches the wet flats where the drainage is so poor that the water stands upon the surface beneath the oak and beech timber a greater part of the year. There is an intimate relation between topography and the character of the soil here. There is a comparatively level plateau extending from the Ohio River "Bluffs" to the northward, west of the valley of Whitewater, and forming the watershed of a number of streams, some running into the Whitewater and some into White River. The surface soil is usually a white or gray clay, characteristic of the country within thirty miles of the Ohio River in the southeastern corner of the State. From this one descends until the "broken uplands" are found lying just below the level land. Still lower down the "hill-sides" are reached. These rise more or less abruptly from the bottom lands. The prevailing timber of this region is oak, maple, beech, sweet gum, black gum, etc., and with them are found, each in its season, some birds which prefer these surroundings—summer redbird, Cape May warbler, black-throated blue warbler, etc. East of the Whitewater River to beyond the Ohio line the country is more level and the soil darker and more fertile, the land ranking with the best in the State. The central portion of the State is comparatively level and very fertile. It was more recently settled than the southeastern portion, and hence today there may still be seen among the finest farms specimens of the largest trees to be found upon the Indiana soil. The northeastern part of the State has been but little explored by the zoölogist. Doubtless it will prove a valuable field for the one who will occupy it. This is the "lake region" of Indiana. Within this quarter is the meeting of two drainage systems—the Wabash to the southwest and the St. Joseph and St. Mary's to the northeast. The Wabash River is the principal line of migration in Indiana. As it turns to the eastward many routes leave it for the north, particularly just south of Lake Michigan, but many birds follow its course along its length. To this fact seems to be due the peculiar distribution of such forms as the Prothonotary and Cerulean warblers, and in less degree the Kentucky, worm-eating and sycamore warblers.

CHANGES IN BIRD-LIFE.

BY AMOS W. BUTLER.

When our race first viewed this region it was a vast forest, a wilderness, unbroken save by the water courses, the trail of the Indian, the runways of the deer, the roadways of the buffalo. Our birds were only such as frequented the densest woodland or the bars in the river channels, together with forms of wide range and birds of passage. With the cutting away of the larger trees sprang up thickets, and therewith came thicket-inhabiting forms. As the clearings were extended meadow lands and pasture lands were reserved. To the meadows came such forms as the bay-winged bunting, field sparrow, black-throated bunting and grasshopper sparrow, species peculiar to such surroundings. Some parts of this land were wet and, where the drainage was not good, became swamps and sloughs. There birds peculiar to such localities settled, among them marsh wrens, rails, gallinules, swamp sparrows and red-winged blackbirds. As the orchard and garden developed, other birds, well known to us and greatly beloved for their cheery, social ways, there made their home; such are the orchard oriole, warbling vireo and yellow warbler. The changes in condition and continual increase in the number of settlers cause a continual diminution in numbers of many birds; especially is this true of geese, ducks and other water-loving species, while some birds famous in history and literature have passed from us and are fast becoming extinct. Such are the ivory-billed woodpecker, pileated woodpecker, wild turkey and Carolina parakeet. About our homes the blue birds, house wrens and Carolina wrens came and lived with us, even nearer and dearer than other birds.

As time went on drainage became a feature introduced into the new country. With the drainage of our sloughs and swamps a second change was noted. The forms of avian life, which lived among its reeds and flags, mingling their voices with those of the frogs, disappeared, and the land reclaimed tells, in its luxuriant growth of corn, no story to the casual passerby of the former population which occupied it. Time went on, change followed change, little by little, but still each cleared field, each rotation of crops, each one of a thousand variations in cause had its effect upon the numbers or the life history of our birds.

DESTRUCTION OF BIRDS.

BY AMOS W. BUTLER.

By man's agency the English sparrow was introduced, and as its numbers increased, began to assert itself in the struggle for existence. The bluebird, which has come from the hole in the snag, was driven from her box. The martin and chimney swift, which formerly nested in hollow trees, left their nesting sites about the house, and even the eave swallow, which in olden times fastened its nest to the cliffs, was in some cases driven away. The warfare still continues with this aggressive little foreigner, worse some places than others, but with such surprising powers of reproduction and unheard-of audacity, it seems they must soon cover our entire continent.

Another epoch in this category is marked by the abnormal craze which has for some years been noted of using the skins and parts of birds for purposes of decoration and adornment. This barbarous custom has been frowned down upon in some places by society leaders, but it is still quite common.

It is marvelous, the destruction of innocent, beneficial lives that have been sacrificed upon the altar of fashion. Our State has now a very good law for the protection of our native birds, and it behooves us all to see that in our communities, our separate neighborhoods, that law is fully enforced. Unless this is done we may awake too late to the importance of protecting these feathered friends who gather their substance from the insect enemies of the farm, the orchard, the garden and the woodland.

Birds are also destroyed in great numbers by natural causes. The sudden severe storms which occur at times in the migrating season often cause the death of a great many tiny wanderers. It is no unusual thing to find along the shores of Lake Michigan, and numbers of other great lakes, following some severe, cold storm, the bodies of great numbers of migrating birds. How great this loss of life is cannot be estimated, but they are often found lying close together on the beach where they had been tossed by the waves. Again, it is no unusual thing to find, following a spell

of cold weather in April or May, the bodies of many birds which have just arrived from the South and have been unable to withstand the effects of the sudden cold which came upon them. Other birds which irregularly winter with us, at times when they attempt to remain, are destroyed in great numbers in unusually severe and unfavorable winter weather. A striking illustration of this was the severe weather of the late winter and early spring of 1895, when, over almost the entire Southern States east of the Mississippi, a cold wave prevailed coincident with the winter range of the bluebirds, hermit thrushes, robins and other birds occupying that region. These wintering birds were destroyed in great numbers—so great, in fact, as almost to exterminate the entire race of bluebirds and to greatly lessen the numbers of some other forms. In addition to this, many birds are destroyed at the time of migration on dark nights by flying against the lighthouses, light towers and other lights in high places. Unfavorable weather during the breeding season is also the cause of large loss of life among the young birds and of the destruction of many eggs.

In addition, birds are subject to disease, fall a prey to their enemies, are killed by accident, and, as these conditions combine in a favorable or in an unfavorable way, we may note among many species, taking one year with another, an increase or a decrease in their normal numbers.

BIRD MIGRATION.

BY AMOS W. BUTLER.

The migratory instinct is one of the wonders of nature. The origin of migration seems to reach far back into the unwritten history of the past. According to geological testimony, in the earlier ages of the earth's history a warm climate existed almost to the north pole. Then neither lack of food or the consequences of rigorous winter compelled the birds to leave their favored region. With the changing of conditions by which the circumpolar area became colder, then ice-locked and finally the limit of ice extended far to the southward, the birds were forced to more congenial lands. With the winter they sought warmer climes, and as the summer approached they sought to return to their ancestral home. Finally the southern limit of the ice sheet was reached, and it began to recede. With its recession the birds were enabled to reach higher latitudes, and in time, when the frigid area reached its present limitation, there was left for our solution the problem of the migration of birds. This habit is not the acquirement of any one bird, but is the influence of the experience of many generations of birds extending through long ages of time, an inherited desire to seek nesting sites near the old home of their race.

With what regularity do certain forms leave their summer homes in the temperate and frigid realms and traverse the great expanse of plain and wood and ocean to far within the tropics, there spending the colder parts of the year, returning to the same breeding ground when summer approaches! Unerringly they pursue long lines of migration, as though following beaten paths, for thousands of miles. O'er river and lake and sea, o'er marsh and mountain and meadow they fly. So accurate is the chart, so true the compass of instinct, that each returning annual pilgrimage brings the little wanderers to their former homes. When the frosts touch the maple leaves and tinge the woods with bright autumn colors we miss some of our little friends. Day after day as the daylight grows shorter, others follow where they led, until, when the snows

come, many of the summer songsters have left us. These have sought the regions best suited to their condition in winter, where the food supply is more abundant and more easily obtained. Others from farther north have taken their places. These, to us, are winter residents. To our friends further north they are summer residents; between us there is a region where they are known as migrants. Among these latter birds which spend a part or the whole winter in our State are the Junco or black snow-bird, one form of shore lark, tree sparrows, the sapsucker or yellow-bellied woodpecker, rarely the white snow-bird or snowflake, the snowy owl and the Bohemian waxwing. Their summer homes are north of us.

Some of the forms, perhaps most of them, which are with us the whole year round are not represented in winter, spring, summer and autumn by the same individuals. In the winter the song sparrow among the garden shrubbery or in the willow thickets are not particularly numerous, but late in March and early in April a host of song sparrows have appeared from the milder climate of Tennessee and neighboring States. Their numbers are very noticeable, but they, with many, perhaps all, of those who wintered with us, have passed on farther north. The usual number remains to keep house, rear a family and cheer humanity with their songs. With October those who spent their summers farther north return, and, as the frosts succeed dews and snows succeed frosts, they gradually pass by to favorite winter homes, leaving the individuals we knew the past winter with their children, our companions through the colder part of the year. The American goldfinch that appears with the apple leaves in April in lemon-yellow dress with black cap and wings, comes from the southland to replace other more hardy relatives of his by the same name, who were hardly recognized by many of us for the plain winter dress they wore. Well, they passed on northward just a day or two before these brighter-appearing ones arrived from the pine groves and cotton fields of the Southern States. Next fall they will return with their bright colors deadened by the touch of the north wind, but we will know them by their voices.

The impression which may prevail that the winter residents are smaller than the summer forms is erroneous. The shore-larks, which winter with us, represent the same species which is resident

in summer and the northern form which is larger. The idea that many birds migrate at night is correct.

Some winters the robins, meadow larks, kingfishers, killdeers, red-headed woodpeckers and chewinks remain with us. Other years they pass to the southward. Even when they are here, some years they seem to the casual observer to have left; yet the inquisitive lover of birds knows his little friends are to be found, even in inclement weather, though they do not appear to the uninitiated. To such an one a protected thicket, a deep ravine, an unexposed hillside, a dense woodland, as his tramp leads through such out-of-the-way places, is found to be inhabited by forms which have disappeared to many eyes. The instinct which calls upon some to seek the better feeding grounds, the warmer places of the earth, has impelled these to well-protected spots and localities where food may be most easily obtained.

The catbird, blackbird, chipping sparrow and phoebe go but a little farther south, some years lingering along the Ohio River.

The marsh wrens, red-winged blackbird, hermit thrush and sometimes the beautiful little ruby-crowned kinglet and eccentric little blue-gray gnat-catcher linger along the gulf coast, while all the north is snow-bound.

Other birds go farther on their winter journey. The Baltimore orioles go as far as Panama. Our cheering bobolink with "his Quaker wife," both plain clad when cold comes nigh, visit the West Indies and South America. The kingbird visits the West Indies and Bolivia. The night hawk covers the same islands and eastern South America. The Cerulean warbler, on the contrary, visits Cuba and Central America.

Kirtland's rare warbler winters only in the Bahamas. The little spotted sandpiper visits Brazil. The blue-winged teal extends its journey to Equador, and Swanison's thrush to Peru.

Some make more extended tours even than these. The American golden plover, a well-known game bird, which breeds in the northern part of our continent, when winter holds the northern hemisphere in his cold grasp, is found as far away as Patagonia, while the knot, a coast bird which breeds in very high northern latitudes, the eggs of which were taken by the members of Greely Arctic expedition at Fort Conger, about north latitude 82 degrees, ranges to Cape Horn during our winter. Thus it will be observed

migration may mean the trip to the protective thicket in the vicinity of wild grapes, blackberries and weed patches laden with seeds at the southern end of the farm, or the almost endless voyage of some shore birds across every one of the earth's zones. It may mean a change of individuals; a moving of those which summer with us a little farther south and a filling of their places by others of the same kind from a little farther north. It may mean a restlessness which some years impels the Bob White to move southward a few miles, or again to leave the hills and congregate in the valleys, or the reverse. Many times they fly into towns, and becoming confused, enter houses and stores, and are readily caught in the hand. It may mean the slow movement of the short-winged warblers and wrens, or the rapid flight of the swallow and wild pigeon. Its cause is the instinct which tells them to prepare for winter or return for spring. A call that must be answered, an inherent demand that comes to each individual through the accumulated experiences of the past which it can not disobey.

Birds do not move promiscuously over the country, but are observed to have migratory routes. The Mississippi is a great artery along which in spring courses a mighty stream of avian life destined to its breeding ground. At the mouth of the Ohio a large stream turns off to ascend that river, sending out branches of considerable size up the Wabash, Whitewater and Miami rivers. The Whitewater Valley forms one channel by which these wandering birds reach the Maumee and the lakes, whence many pass on still farther northward to their summer homes. As the rivers become the channels of migration for certain species, other forms of different habits follow the higher lands or mountain basis, along characteristic topographical features. As the warm air of spring comes, as from the throbbing of a great tropical heart, so the birds come, in pulsating movements, each succeeding one stronger and driving its tide of life farther along its course. Each bird-wave seems to move as though the rear of the migrating forms was continually passing over the more advanced and taking the lead. Among the smaller streams, the main ridges, the connecting woodland, at the height of the migration may readily be observed the smaller currents of birdlife given off by the larger streams, each following its own course, all instinctively going in a definite direction—north. The whole movement may be compared to the

circulation of sap in a tree. From trunk to limb, from limb to branch, from branch to bough, from bough to twig, from twig to leaf. The entire movement over either hemisphere may be likened to numberless trees with their roots at the equator, their topmost branches approaching the poles. In autumn the courses of the bird currents are not so plainly marked, but yet along the borders of our streams may be seen, at favorable times, hordes of little wanderers moving past in almost endless streams at early morn and eventide.

OUR BIRDS IN WINTER.

BY RICHARD F. SOUTER, FIRST VICE-PRESIDENT INDIANA
AUDUBON SOCIETY.

Arbor Day comes with the falling of the leaves and the southward flight of the birds. That unnumbered host that followed the flying feet of the spring northward has accomplished its mission and now retreats before "the ruler of the inverted year." In the spring their peering eyes and busy bills seemed to leave no bud unprobed, no crevices unsearched. And as leaf followed bud and fruit blossom they were the unwearied defenders of their hosts, the trees. But when autumn comes and their work here is finished they answer the call of the land of the snowless lea and the fadeless leaf. The tide of loveliness and song that swept northward, now ebbs here to flood there again, and the southern sky is glad with bird voices and with whispering wings.

Of course the north is not left all desolate. Wherever birds dwell at all some remain all the year round. In the remotest north some birds, notably birds of prey, and some of the water fowl endure the "white silence." In our own State very considerable lists have been formed of winter residents. Some of our winter birds, as the cardinal and the jay, are true residents and make no change of their abode for either cold or heat. Others like the cross bills and the snow flakes come to us from a yet colder north and are pushed out of their Arctic home only by the severest rigor of winter. And others as the robin and blue bird are the sturdy rear guard of a main army which has retreated far to the south of them. All these, however, which cling to the north are but a handful compared to those which haunt the orange groves and bay berry thickets, the uplands grave with endless leagues of pines, the hammocks bright with magnolia and laurel. For while many birds, like the swallow, check not their flight until they have crossed gulf and sea, the vast majority of our Indiana birds never leave the shelter of the stars and stripes. They have gay times too in the south. The cares of nest building and rearing the young are past. Food is abundant so they can dwell in flocks. Storms are of but rare occurrence. Indeed, winter is one long holiday. There is, however, an air of quiet content about

them very different from their gay jubilation in the north. Listening to the murmurings and calls and "chips" of a flock of a hundred warblers of a half dozen different sorts you would think them a kind of children's sewing society, too busy to be hilarious, too happy to be sombre. Many sorts of sparrows will also unite to form an apparently constant company. Many of the larger birds, also, as robins and grackles form notable flocks.

On the other hand some of the thrushes, Swainson's, the hermit and others are as shy and solitary south as they are north. The Maryland yellow-throat makes no change whatever either in habit or song and along the edge of the Tohopekaliga saw grass behaves just the same as by any of our lakes or streams.

Of birds even in the north it can scarcely be said: "Here shall they have no enemy save winter and cold weather." In their southern home that enemy is escaped but others they have with them always. Hawks are numerous and particularly the Copper and sharp-shinned, quite destructive. Yet again and again I have seen a hawk strike through a flock of hundreds of warblers which rose as one at his approach and seize no victim from it. From four footed enemies they are comparatively safe in the south, and from snakes a mature bird has nothing to fear. Their worst enemy there is the boy or man with a gun. Very great numbers of our most loved and most useful birds are shot for food. Nothing exasperates one more than to see worthless men and boys, white and colored, destroying our friends whom we protect so carefully here and whom our thoughts follow with so much affection on their southward flight. Happily most of the shotguns which they use are of antiquated patterns. A change is rapidly taking place, however, in the attitude of the south toward our birds. Some of the States already have the model bird law in force, its provisions posted through the country, and wardens to enforce it. Before long we may hope that the birds will be loved and protected south as north.

Thus the birds will live and be glad through the winter season. Then when the grip of the cold begins to relax the swallows will cross the sea and linger in Florida and on our southern coast for awhile. The hardier birds will be following the spring more closely. Wave after wave they go until some morning the swallows vanish from the lake, the last warblers have left orange grove and hammock tangle and it is summer here.

PHOTOGRAPHING BIRDS.

BY HIRAM W. KELLOGG, PRÉSIDENT INDIANA AUDUBON SOCIETY.

The coming of the camera indicates a kindlier age. It will take the place of the gun and trap and afford a recreation more fascinating. It will eliminate cruelty while it challenges all the skill and courage of the old sport. It will afford equal excitement with no injury to the delicate sentiments of our better nature. Thus it will cultivate and encourage an affection for the animal world around us. Mr. Carpenter, in his admirable work on this subject, says: "As a one-time sportsman, who yielded to none in his enjoyment of the chase, I affirm that there is a fascination about hunting the wild animals with a camera as far ahead of the pleasure derived from their pursuit with a shotgun or a rifle as the sport in shooting quail is beyond that of breaking clay pigeons. Killing a bird with a gun seems little short of murder after one has attempted to capture its image with a lense. The camera thus opens a door to a field of sport previously closed to those who love birds too much to find pleasure in killing them." The exciting delight of capturing your game and carrying it home to your friends after a long and difficult pursuit, with no injury to the innocent bird is an experience that is worth knowing.

IT AWAKENS A TENDER INTEREST AND BEGETS A COMPANIONSHIP WITH BIRDS.

How this is cannot be easily explained but experience attests its truth. While I have been interested in birds from my boyhood, and began the study of their wild life on the old farm and knew them well, visiting their homes frequently and helping them in times of trouble, yet with this new work has arisen a peculiar interest I never before felt. My early sport was in locating their nests, watching their tricks and listening to their songs, but to coax them into friendship and cultivate a familiarity necessary to successful picturing was to enter companionship hitherto unknown. It opens a new circle of acquaintance worth cultivating. An intimate friend, whose knowledge of bird life has made him



I placed the young wrens on my boy's hat.

an authority, and whose help has made possible much of my best work—a real lover of birds for years—said to me one day as we were returning home from a bird hunt, having gained rich trophies by some daring adventures, “It seems to me that I have never truly loved birds until I became interested in this work. It has given me such a sense of companionship with them that I could never contentedly go back to the old methods of study.”

IT ENCOURAGES A CAREFUL STUDY OF THE NATURE AND HABITS OF BIRDS.

It is not for recreation alone that I would encourage the practice but for the knowledge we gain of bird life. If the work is successful to any degree it will be because of a familiarity with the habits of birds. And as we seek to do the work we shall find that intimate knowledge of birds is essential. The places and time of nesting, the length of breeding season, indeed every particular item of information will come into requisition before we have gained our best results.

WAYS AND MEANS.

Successful work is not so difficult as at first might appear. An ordinary knowledge of photography will bring good result although the more thorough the knowledge of the art the better the results.

The outfit may be very simple. A common camera will do, yet of course the better the camera the higher the grade of work and the surer is your game. As in hunting with the gun, a good gun will likely bring down more game than a poor one although many of us have had delightful sport with rather bad firearms. If it can be afforded, the best camera should be purchased, and “the quality of a camera is the lens.” A quick lens is sometimes too slow. A few attachments beyond the usual outfit are necessary. Some for concealing the camera, some for placing it in peculiar positions and others for allowing the operator to hide away. Mr. Carpenter has fully described the necessary outfit in the book above referred to.

OPPORTUNITY.

Opportunity is more important than all else. This is to be secured, not by chance, although sometimes luck favors you, but by patient study and hard work. For instance a bird builds its

nest near your home; here is your chance. With care you can tame it and arrange positions for the camera and prepare for a series of pictures that will enrich your collection. But birds do not, as a rule, come to your art gallery and pose. They do not even seek you for the purpose of having pictures taken of themselves or their children. You must go after them and this sometimes means toil that is more than recreation. Some birds are difficult to reach but the tax upon skill and patience in overcoming the difficulties doubly repay in the satisfactory results. Mr. For-dyce, a busy merchant and banker in Ohio whom I have the honor to hold in very personal friendship, took a succession of pictures of a Cooper hawk's nest seventy feet from the ground. He climbed the tree three times a week for six weeks. When he had finished he possessed a set of pictures that took the first prize at the national exhibition and what was better he knew many things about Cooper hawks that had never been discovered by man.

Some birds are difficult to approach and handle. Among the most trying incidents in my years of experience that I have encountered on the ground, was photographing a family of brown thrashers. They were in the wilds. Five of them in a nest. At my approach they did not wait to salute me but moved out with a rush that startled me. They had not well calculated their strength for they dropped to the ground not far away. They were gathered with care and then the fun began. They were obstinate or fearful, or both, and refused to sit in position. For more than one hour the trial went on of placing one little culprit after the other. Strength and patience were about exhausted, a storm was approaching, nerves were taxed to their utmost endurance and judgment decided that the attempt had better be abandoned and the trial end in defeat, when suddenly a calm came over them and they nestled together in a little group and the pictures were secured. Victory was won and as when the child turns from irritating restlessness to be "very good" the anger of the parent changes into fond admiration so my patience turned to a happy interest in the little group and I placed them again in their cozy nest and gave them over to the care of their anxious parents with my very best wishes. I had won my spoils and had done the birds no harm. Almost every picture I possess has a history that borders on a romance if not a tragedy.



Young Brown Thrashers being "very good."



The young wrens near the nest—The mother feeding them.

Not far from our city limits I found a catbird sitting in the burning heat of a June sun. The nest had been built in a wild rose bush under heavy shade, but worms had eaten the leaves away and the poor bird was left unprotected. She was sticking to her home in spite of the withering heat. This was my opportunity. I could now favor her and maybe win her respect. So I cut branches from a nearby tree and covered her from the sun and went away. The act was appreciated and soon I had her confidence. When the little ones appeared I had become a familiar friend and found no trouble in securing many sittings of a family group. This wild bird was tamed and furnished me some of my best pictures. As one advances in the work opportunities multiply.

We were spending the summer season by the beautiful lake Okeboji in Iowa. A cold morning drove us out for wood and we chopped down a tree. As it fell we discovered that we had disturbed the home of a wren. Five little fellows flew in as many directions, and hid in the grass. They were soon secured and arranged on a stick by the stump where the nest had been located. The camera was not far away. Pictures were taken. The parent birds were away searching for food. On their return they were taken by surprise at the new surroundings and for a few moments

stopped to view the situation. Not long were they idle. They began to bring food to the little hungry mouths and now a rare opportunity came. All manner of positions were taken of the feedings and many plates were exposed. At last the little ones were placed on the hat of my boy, who had been my companion in much of my work, and to our surprise the mother seemed to enjoy the new perch and lighted on the hat and as every little mouth went open, the camera took them all in without hurting them in the least.

Many have been the interesting hours spent in this recreation and sport and valuable has been the information gained by the work. The busy city has been changed for the open fields and woodlands, skill and patience have been put to the test but never has an hour failed to yield a joy and excitement that has never been found in other sport.

While it may require more training and longer time to acquire mastery yet it out-pays all other. I would be glad to encourage boys and girls of our State to attempt it, and to pursue it until it contributes to their joy in pleasureable pastime, providing a stimulating recreation to body, mind and heart, and awakening interest in and companionship with our "Out of Door Friends" that will make life stronger and more delicious.



"A family of Kingfishers.

BIRD SONG.

BY JULIA S. CONKLIN, WESTFIELD, INDIANA.

Nature has ever been the fountain from which the poet has drawn his sweetest inspiration; the deep mine from which he has gathered the richest treasures of thought, the choicest gems of fancy; and in all songs of out-of-door life, the birds have received a large share of attention.

Fields and woods and birds and flowers are in the mind inseparable, and in many nature poems where birds are not the direct theme, they are incidentally referred to, oftentimes with great beauty and tenderness of imagination. Almost every known variety of bird of almost every clime has furnished a subject to some writer of verse.

We read in the Bible of the sparrow, the dove, the partridge, the peacock, the hawk, the ostrich, the eagle; and Shakespeare makes frequent mention of the "musicians of the air."

The lark, the sparrow, the robin and the nightingale are favorite subjects of bird song. The English poets have shown a decided partiality for the sky-lark and have dedicated many beautiful verses to this poetic songster.

But is it not to our American writers and their poems of American birds that we turn for our deepest enjoyment of bird song? Bryant, Longfellow, Whittier, Lowell, Emerson, Aldridge, VanDyke, John Burroughs—our hearts warm at the very mention of their names.

Bryant, America's first nature poet, has been called the Druid of our literature, and indeed the name suits him well, for he seems always to have dwelt in the shadows of the trees. Who does not experience a thrill somewhat akin to that of childhood when he recalls the "Lines to a Waterfowl"? And who does not remember how, in childish fancy, he followed the thought of the poet as he read:

Whither, mid falling dew,
While glow the heavens with the last step of day,
Far through their rosy depths dost thou pursue
Thy solitary way?

What tender satisfaction accompanied the thought expressed in the following stanza:

Vainly the fowler's eye
Might mark thy distant flight to do thee wrong
As, darkly seen against the crimson sky
Thy figure floats along.

Then follows the poet's description of places seen by the bird in his migratory flight—of "weedy lakes" or "Marge of river wide," still on and on the fancy follows through the "cold thin atmosphere," until the home is found among its "fellows."

And then there dawns upon the childish mind the great truths of the lesson to be learned—

He who from zone to zone,
Guides through the boundless sky thy certain flight,
In the long way that I must tread alone,
Will lead thy steps aright.

Through all of Bryant's poems runs a sweet bird melody; the outpouring of a spirit that lived in close communion with the songsters of the woods and fields. Many of our familiar birds became his inspiration, and we may trace the changing seasons in his bird songs.

"List to the brown thrasher's vernal hymn!" he exclaims, and involuntarily we pause to listen. A breath of the cold early spring winds touches us as we read—

Already close beside our summer dwelling,
The Easter sparrow repeats her song:
A merry warbler, she chides the blossoms—
The idle blossoms that sleep so long.

But the breeze that fans our cheek grows softer, as we read—

There's the hum of the bee and the chirp of the wren
And the dash of the brook from the alder glen.

Again—

Woods are full of birds and fields of flocks.

And—

The robin warbles forth his full clear note
For hours, and wearies not.

The blue bird chants from the elm's long branches,
 A hymn of welcome to the budding year;
 The south wind wanders from field and forest,
 And softly whispers, "The spring is here."

The season advances, and—

The sweet lay of the mocking-bird
 Rings in the morning air.

The hermit thrush—

Pipes his sweet note to make your arches ring;
 The faithful robin from the wayside elm
 Carols all day to cheer his sitting mate.

Then the evidences of summer appear, for—

See from the reedy earth a rivulet break
 And purl along the untrodden wilderness:
 There the sky-cuckoo comes his thirst to slake,
 There the shrill jay alights his plumes to dress.
 The tulip tree high up,
 Opened in airs of June, her multitude
 Of golden chalices to humming birds.

Again the season advances, and—

The mother bird hath broken for her brood
 The prison shell, or shoved them from the nest,
 Plumed for their earliest flight.

Then the autumn draws near—

The robin and the wren have flown
 And from the shrub the jay,
 And from the wood top calls the crow
 Through all the gloomy day.

It is winter now, and—

The snow-bird twitters on the beechen bough.

We see the snowclad country landscape; the dead brown leaves clinging to the drooping branches of the spreading beech, the clinging moss with its soft beautiful tints of greens and browns, and are ready to declare, "Winter is indeed here."

Had Longfellow written nothing else "The Birds of Killingsworth" would have served to make his name immortal.

It was the season when all through the land
 The marble and mavis built, and building sing
 Those lovely lyrics, written by his hand, who
 Saxon Caedon calls the Blithe-heart King;
 When on the boughs the purple buds expand,
 The banners of the vanguards of the spring;
 And rivulets, rejoicing, rush and leap,
 And wave their fluttering signals from the steep.
 The robin and the blue bird piping loud,
 Filled all the blossoming orchards with their glee:
 The sparrows chirped if they still were proud
 Their race in Holy Writ should mentioned be;
 And hungry crows, assembled in the crowd,
 Clamored their piteous prayers incessantly,
 Knowing who heard the raven's cry and said,
 "Give us, O Lord! this day our daily bread."

And then the poet tells how the thrifty as they tilled the earth,
 heard with alarm the cawing of the crows and—

Shook their heads,
 And doomed with direful words to swift destruction
 The whole race of birds.

Then a town meeting was called to

Set a price upon the guilty heads
 Of these marauders who, in lieu of pay,
 Levied blackmail upon the garden beds
 And cornfields, and beheld without dismay
 The awful scarecrow, with his fluttering shreds;
 The skeleton that waited at their feast
 Whereby their sinful pleasures were increased.

The meeting was held and was attended by the dignitaries of
 the town—

With sundry farmers from the region round;
 Ill fared it with the birds, both great and small:
 Hardly a friend in all that crowd was found,
 But enemies enough, who every one
 Charged them with every crime beneath the sun.

Then arose the Preceptor and plead for the birds—

Alike regardless of their smile or frown,
 And quite determined not to be laughed down.

Then follow those beautiful lines so full of tenderness and
 sympathy—

Plato, anticipating the Reviewers,
 From his republic banished without pity
 The poets. In this little town of yours,
 You put to death by means of a committee,
 The ballad singers and the troubadours,
 The street musicians of the heavenly city,
 The birds, who make sweet music for us all
 In our dark hours, as David did for Saul.
 The thrush that carols at the dawn of day
 From the green steeples of the piny wood;
 The oriole in the elm; the noisy jay
 Jargonizing like a foreigner at his food:
 The blue bird balanced on some topmost spray,
 Flooding with melody the neighborhood;
 Linnet and meadow-lark, and all the throng
 That dwell in nests and have the gift of song.
 You slay them all. And wherefore? For the gain
 Of a scant handful more or less of wheat,
 Or rye, or barley or some other grain
 Scratched up at random by industrious feet
 Searching for worm or weevil after rain:
 Or a few cherries that are not so sweet
 As are the songs these uninvited guests
 Sing at their feasts with comfortable breasts.

He then makes this appeal—

Do you ne'er think what wondrous beings these?
 Do you ne'er think who made them and who taught
 The dialect they speak, where melodies
 Alone are the interpreters of thought?
 Whose household words are songs in many keys,
 Sweeter than instruments of man e'er caught;
 Whose habitations in the treetops even
 Are half way houses on the way to heaven.
 Think, every morning when the sun peeps through
 The dim, leaf-latticed windows of the grove,
 How jubilant the happy birds
 Renew the old, melodious madrigals of love;
 And when you think of this remember, too,
 'Tis always morning somewhere, and above
 The awakening continents, from shore to shore,
 Somewhere the birds are singing evermore.

Then the poet vividly pictures the woods and fields and orchards
 destitute of these happy little friends of man, and foretells the
 destruction of the crops of fruit and grain which must surely
 follow their extermination. But all in vain. The birds are
 slaughtered and as he predicted, dire calamity followed. At last

convinced of their mistake, another town meeting was held and the birds were recalled.

One can easily discern through his poems that Lowell held close communion with nature—that he lived in touch with all out-of-door life.

Could anything be more exquisite than Henry VanDyke's lines to the Maryland yellow-throat?—

A living sunbeam, tipped with wings:
A spark of life that shines and sings
Witchery—witchery—witchery!

The foremost living nature poet is John Burroughs. So close to nature does he live that we seem to feel her heart throbs in his verses.

In a poem entitled "The Swallow," he says—

At play in April skies that spread
Their azure depths above my head
As onward to the woods I sped,
I heard the swallow twitter.
O skater in the fields of air
On steely wings that sweep and dare,
To gain these scenes thy only care,
Nor fear the winds are bitter.

Is not the imagination carried away into infinite space by the line "O skater in the fields of air," and does not the mind picture the steady onward gliding of this spirit of the air as it sweeps and dares? In a poem entitled "The Bush Sparrow" he refers to its song as a trilling

In notes that circling run
Like wavelets in the water
That go rippling in the sun.

After describing his coat of russet trimming, and his russet crown and referring to him as a "plain country cousin" with a "plain country gown," he says—

He hides in weedy vineyards
When August days are here,
And taps the purple clusters
For a little social cheer;
The boys have caught him at it:

The proof is fairly clear;
 Still I bid him welcome,
 The little pil'f'ring dear:
 He pays me off in music,
 And pays me every year.

He speaks of the vesper sparrow as a

Minstrel of the twilight fields,
 A voice from out a tranquil breast—
 When closing day invites to rest,
 Peace, good-will, and then good-night,
 While toil and care now take their flight.

He then describes the bird as sitting close upon the ground, or
 “perched upon a warm gray stone,” while its song floats sweetly
 upward, and says—

Peace, good-will, and then to rest,
 With loving thoughts of mate and nest.

He closes the third stanza with—

Peace, good-will, then close the eye,
 While daylight fades in western sky.

Then we see the shadows deepen 'neath the hills and breathe the
 fragrance of the summer night through the heart throbs of the
 poet; then, again—

Peace, good-will, then fold the wings
 'Till morning light new solace brings.

In the next stanza we catch the vesper sound “like wandering
 note of silver flute,” and again—

Peace, good-will; warm broods the night
 While moon and stars make silver light.

Then the bleating of a lamb disturbs the hush of night; but—

Peace, good-will, and do not fear,
 Thy watchful mate is always near.

All becomes quiet; we feel the hush—

The day is done.
 Thy head is tucked beneath the wing;
 The silver web by Luna spun
 'Oer all the hills is glistening.
 Peace, good-will, and then good-night,
 'Till skies are filled with morning light.

THE SPIRITUAL SIDE OF BIRD PROTECTION.

BY MARTHA NICHOLSON MACKAY.

After the battle of Spottsylvania in 1864, the Assistant Secretary of War, with but one attendant rode out to the battlefield. It was the month of May and just after sunset. Twilight was deepening over that awful scene. This was the spot where the two armies had met in one of the most terrible struggles of our Civil War.

The very ground had been trodden into an almost liquid mass. Over the field the surgeons and the hospital corps were hastening, trying, as they might to alleviate the frightful agony, caused by the musketry and cannon. Suddenly from one of the trees, recently torn and twisted by artillery came a voice of a bird. Sweet and clear it rose above the groans of the wounded; an evening song of trustful love. Not all the horrible discords of human warfare could prevent this little note of unconscious faith that after the night there would dawn another morning. "It was," said the Secretary, "more startling at that time, and in that place, than a discharge of musketry or the cannon's roar." That voice from Nature's heart; the song of the tiny bird following the terrible discord of war. It has seemed to me that this little incident typifies in part, the double mission of bird life.

To preserve the harmony of nature, birds have a large share in the agricultural welfare of the world, and through this the commercial world is influenced; but, aside from these considerations, there is, in the contemplation and the study of bird life, something far more spiritual than can be found elsewhere. The wonderful music of their songs, the color and movement they add to wood and field, but, above all, their evident possession of our own human attributes of fear and love, parental devotion, and faithful companionship.

Without investigation we cannot know the indebtedness of literature to bird life. What would Edward Rowland Sill's wonderful poem of the dawn be, without this verse?

In the deep night a little bird
 Wakens, or dreams he is awake;
 Cheerily clear one phrase is heard;
 And you almost hear the morning break.

Art is equally indebted to the inspiration derived from the study of, and love for, the birds. As far back as research can take us, we still find the worship of wings, and their use as a precious symbol.

From Persian and Assyrian art, down through the middle ages, until Guido Rene makes St. Michael not more famous for his beautiful face and form, than for his powerful wings; and these enable him to avenge the innocent and punish the guilty spirit hiding in the dragon's form. In our day, science is making clearer the myth and fable of the ancient records. Slowly, are we admitting that we are akin to all sentient life below us. But just now, are we not falling behind in our care for and appreciation of our brothers of the air?

It is not alone the material side, it is the higher, the spiritual side that is in danger. It is not alone, that the orchards and crops suffer, when the varied and beautiful hosts of native birds are killed; in their destruction, the finer human instincts of tenderness and justice are also slain.

The spiritual side—it is the real side. We have very ancient testimony that the things that are seen are temporal, that the unseen things are the important and eternal ones. The cultivation of a love for tenderness, for justice, for simplicity—the emphasis upon the study of nature and her varied laws, all this we have come to believe is due the child we would educate and equip for life. How our work is hindered, thwarted by our ignorance of only two things—the value of the birds and their natural homes, the trees.

The very sight of birds leads us toward thoughts of spiritual things—they bless us, and do not trespass upon us. How can we protect them, until those who would now thoughtlessly destroy them, will join us in grateful appreciation of them and their mission on the earth.

By the multiplication of societies like our own, by faithful work in season and out of season (and reformatory work is always

branded as out of season). By striving for better legislation, but realizing that we must always create the public sentiment that will demand the enforcement of these better laws. By these narrow paths shall we reach our mountain's crest.

We have every reason to look forward to the time when the influence of the Audubon societies will do for the preservation and protection of birds, what the societies for the prevention of cruelty to animals have done for our four footed creatures. What more impressive figure in our own day, or in history, than the tall quiet man whose word became law, who came to the relief of the overburdened abused creatures in our land. Who often appeared so unexpectedly it seemed like magic, to the infuriated drivers of overloaded wagons.

Above the crack of the whip and the oaths of the driver, sounded that calm but penetrating demand: "Stop, unload!" Perhaps we shall not have a Henry Bergh to lead us. It may be our strength will lie in the zeal and the work of countless men, women and children, coming from different walks in life, busy in different avocations, but all united in the feeling, that to preserve that manifestation of created life, which sings to us, soars above us, our precious native birds, is to strengthen in us, that which has need of daily renewal, the spiritual side of life.

SOME COMMON BIRDS.

Last year the following birds were briefly discussed in the Arbor and Bird Day program: Red-headed woodpecker, Bob White, Baltimore oriole, the wood thrush and house wren. Under each discussion it was suggested that other birds of the same family be studied. This year special attention is called to one other member of each of the families represented last year. These are given in the same order. In addition to this the green heron is discussed. This work may be admirably supplemented by Farmers' Bulletin No. 54—Some Common Birds in Their Relation to Agriculture. Send to Department of Agriculture, Washington. D. C.

The following material is taken from "Birds of Indiana" by A. W. Butler:

THE FLICKER.

(Golden-winged Woodpecker. High Hole. Yellow-hammer.)

Adult Male.—Back, wing-coverts and inner quills brownish, barred with black; rump and upper tail-coverts white; outer edge of quills and tail feathers above, black; shafts of feathers and under surface of same, golden yellow, the tail feathers tipped with black; head and nape, grayish, the latter with scarlet band; a black stripe on each side of throat, below chin, throat and breast vinaceous, the last bordered by a large black crescent; rest of under parts paler vinaceous with black spots. Adult female similar, but without the black streak on each side of throat.

Length, 12.00-12.75; wings, 5.50-6.60; tail, 4.00-4.95.

Nest, a hole in a tree; eggs usually, 5-9 glossy white; 1.10x.85.

Resident, very common southward. Rare in the north part of the State; common everywhere throughout the warmer parts of the year.

It has the greatest number of calls of any member of its family.

The Flicker, with its curved bill, cannot chisel its way into trees as other species do. It, therefore, does not destroy so many insects injurious to trees. In fact, except ants, of which it eats great numbers, is not so destructive to insects as other woodpeckers are.

RUFFED GROUSE.

Adult Male.—Variegated reddish or grayish-brown; the back, with numerous oblong, pale, black-edged spots; neck-tufts, glossy-black; below, whitish, barred with brown; tail varying from gray to rufous, with a broad subterminal black zone, and tipped with gray. Female.—Similar but neck-tufts very small.

Length, 15.50-19.00; wing, 7.00-7.50; tail, 5.50-7.00.

Nest, a hollow in ground, lined with leaves or grass. Eggs, 8-14; milky-white to pinkish-buff often with round spots of pale reddish-brown or drab; 1.58x1.18.

Resident.—The ruffed grouse is found in varying abundance throughout the State. It is a bird of the forest. The rougher hills covered with dense wood and underbrush are the places where they live. They are more common in the northern part of the State, though they are reported in: Monroe, frequent; Carroll, rare; Brown, common; Howard, rare; etc. In the White-

water Valley this bird is known as "pheasant." In some other localities it is called "partridge." These names but serve to confuse one.

The food of the ruffed grouse is quite varied. Grasshoppers and crickets are favorite articles of food. Besides these, caterpillars, ants, beetles, etc., are eaten. They live largely upon insects and fruits including all the berries during the summer.

RED-WINGED BLACKBIRD.

(Swamp Blackbird.)

Adult Male.—Plumage, deep black; lesser wing coverts, bright red, bordered behind with broad band of brownish-yellow, buffy or white. In fall or winter, black, more or less edged with brown. Adult female.—Smaller; above, blackish, with brown and white streaks; light stripe over eye, and inconspicuous light stripe along center of head, lesser wing coverts, with more or less red; wings, barred and edged with white or brownish; below, streaked with black and white; throat, tinged with pink or yellow.

Immature.—Like female, but browner above and more buffy below.

Male.—Length, 9.00-10.00; wing, 4.60-5.05; tail, 3.55-3.95.

Female.—Length, 7.50-8.50; wing, 3.80-4.25; tail, 3.10-3.40.

Nest, in colonies; nests fastened in rushes or other aquatic plants, of grass, reeds and rushes, lined with finer grass. Eggs, 2-6; pale bluish-green, spotted and irregularly streaked with black and various shades of brown, drab and purple; .98x.69.

An abundant summer resident about swamps and the reedy borders of lakes and streams; elsewhere, rare, or only seen during the migrations.

Food.—Vegetable matter forms 74 per cent. of the food, while animal matter, mainly insects, forms but 26 per cent. Of the vegetable matter but little more than 13 per cent. is valuable, grain, corn, wheat and oats, the remaining 61 per cent. being weed seeds. So it is decidedly a beneficial bird.

THE CATBIRD.

Adult.—Above, dark slate-color; somewhat lighter below; crown of head and tail, black; wings, but little shorter than tail; under tail coverts, dark chestnut.

Length.—8.00-9.35; wing, 3.45-3.75; tail, 3.70-4.25.

Nest, in bush or low in tree; of twigs, bark, grass, leaves, strings and rags. Eggs, 4-5; bluish-green; .98x.75.

The catbird is a well known summer resident and its habits well known. Every boy who lives in the country or ranges the fields near some small town knows this plain-clad, many-voiced bird, and can give a good account of its doings.

Food.—Its food consists of 44 per cent. insect and 56 per cent. vegetable. The vegetable food consists principally of wild fruits. While it eats much fruit, it does much good. The fruit season is not long, while the insect crop is abundant throughout all its stay with us.

THE BLUEBIRD.

Adult male.—Above, bright blue; below, throat and breast, cinnamon, other under parts white. Adult female.—Above, grayish; wings, tail and rump blue; below, paler.

Immature.—Similar to female; upper parts and breast marked with white.

Length.—5.70-7.00; wing, 3.90-4.15; tail, 2.60-2.90.

Nest, in hole in tree, post, stump or in a box. Eggs, 4-6; pale blue, unmarked.

The bluebird is a common summer resident. The past twenty or twenty-five years the bluebird has been noticeably becoming less numerous. The persecutions of the English sparrow and several disastrous winters had almost exterminated them. They are now increasing in numbers.

Food.—76 per cent. of its food is insects and allied forms. The other 24 per cent. is various vegetable substances, mostly eaten in winter.

This bird deserves special encouragement and protection. Nesting places should be provided about gardens, orchard groves and yards. If thus protected it will have a better opportunity to regain its former numbers and will be more useful where its powers as an insect destroyer are most needed.

THE GREEN HERON.

(Schytopoke. Poke, Fly-up-the-creek.)

Adult.—In breeding season, with the crown, long, soft occipital erect and lengthened narrow feathers of the back, lustrous dark green, sometimes with a bronzy iridescence, and on the back often

with a glaucous cast; wing coverts, green, with conspicuous tawny edgings; neck, purplish-chestnut, the throat line variegated with dusky or whitish; under parts, mostly dark brownish-ash; belly, variegated with white; quills and tail, greenish-dusky, with a glaucous shade; edge of the wing, white, some of the quills usually white tipped; bill greenish-black, much of the under mandible yellow; lores and iris, yellow; legs, greenish-yellow; lower neck, with lengthened feathers in front, a bare space behind. Young—With the head less crested, the back without long plumes, but glossy-greenish; neck, merely reddish-brown and whole under parts white, variegated with tawny and dark brown.

Length.—15.20-22.50; wing, 6.30-8.00; bill, 2.00-2.55; tarsus, 1.75-2.15.

Nest, of sticks, in small tree or bush, sometimes in orchard. Eggs, 3-6; pale greenish-blue; 1.50x1.14.

Summer resident throughout the State. This small heron is found wherever there is water, about streams, ponds and lakes. It usually makes its nest not far from water, often in orchards. The nests are sometimes placed from 8 to 20 feet above the ground. They usually nest singly, but sometimes in colonies.

SUGGESTIVE POEMS.

POEMS USED IN THE ARTICLE ENTITLED "BIRD SONG." KINDNESS OF
MRS. JULIA S. CONKLIN.

WILLIAM CULLEN BRYANT.

Lines to a Waterfowl.
The Rivulet.
An Invitation to the Country.
The Two Graves.
Upon the Mountain's Distant Head.
The Old Man's Counsel.
Song—The Prairies Glow with Flowers.
Among the Trees.
The Path.
The Fountain.
An Evening Revery.
The Death of the Flowers.
A Winter Piece.

JOHN BURROUGHS.

The Swallow.
The Brush Sparrow.

SIR WALTER SCOTT.

Selections from "The Lady of the Lake."
Selections from The Lay of the Last Minstrel.
Selections from Marmion.
Jovial June.

WORDSWORTH.

The Redbreast and Butterfly.
Lines Written in Early Spring.
To the Cuckoo.
O Nightingale.
To a Skylark.

MISCELLANEOUS.

The Bobolink—Christopher C. Cranch.

The Blue Jay—Emily Dickinson.

Bob White—Marion F. Ham.

The Humming Bird—Paul Hamilton Hayne.

The Warbling of Blackbirds—Jean Ingelow.

Elizabeth, Tales of a Wayside Inn—H. W. Longfellow.

The Birds of Killingsworth—H. W. Longfellow.

Under the Willows—James Russell Lowell.

From Il Penseroso—John Milton.

Knee Deep in June—Riley.

The Skylark—Shelly.

The Blackbird—Tennyson.

The Owl—Tennyson.

The Song Sparrow—Celia Thaxter.

Lines to the Maryland Yellow Throat—Henry VanDyke.

The Robin—John Greenleaf Whittier.

Also see list of poems in last year's program.

OUTLINE PROGRAM.

1. Song—Patriotic.
2. Devotional Exercises—
 - a. Hymn.
 - b. Reading or prayer.
 - c. Hymn.
3. Governor's Proclamation.
4. History of Arbor and Bird Day.
5. Bird Law of Indiana.
6. Short essays—
 - a. The Trees of Our Neighborhood.
 - b. The Pests—
 - What are they?
 - How they destroy trees.
 - How to get rid of.
 - c. The Birds of Our Neighborhood and How They Help the Trees.
 - d. Other Exercises—Reproductions or readings of material in this program.
7. Poems—

Those suggested in this program or other good ones. Use only the best poems.

